162 105 29-5 2014-11-04

Installation and Maintenance Manual

CTC EcoZenith i250

Enertech Group

As your own reminder

Fill in the information below. It may come in useful if anything should happen.

Product :	Manufacturing number :
Installer:	Name:
Date:	Tel. no.:
Electrical installer:	Name:
Date:	Tel. no.:

Enertech AB provides the information with reservation for any typing errors and subject to modification.

Installation and Maintenance Manual

CTC EcoZenith i250

162 105 29-5 2014-11-04

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Congratulations on buying your new product

You have just bought a CTC EcoZenith i250, which we hope you will be very pleased with. In the following pages you can read about how to operate and maintain your boiler. One chapter is written for the property owner and one chapter for the installer.

Keep this manual containing the installation and maintenance instructions. If it is properly maintained, you will be able to enjoy the use of your CTC EcoZenith i250 for many years. This manual will provide all the information you will need.

The complete system tank

The CTC EcoZenith i250 is a complete system tank which meets your home's heating and hot water requirements. It has a built-in immersion heater giving a total of 15 kW and is equipped with a motorised mixing valve which ensures correct and even temperatures are supplied to your heating system. The CTC EcoZenith i250 has a built-in circulation pump for connection to a heat pump.

The CTC EcoZenith i250 is fully designed to work with the CTC EcoAir 406-410 outdoor air heat pump or CTC EcoPart 406-410 bedrock/ground source heat pump. CTC EcoPart 412 can also be connected to the EcoZenith i250 provided that the function "exact primary flow" is activated. All controls for the heat pump and charge pump are built into the CTC EcoZenith i250. With this added feature you achieve a very eco-friendly and energy-saving heating system.

For more information, please see the separate section in this manual.

The CTC EcoZenith i250 has a control system that:

- Monitors all system tank, heat pump and heating system functions
- Permits individual settings
- Displays desired values, such as temperatures, operation times, energy consumption and fault signals
- Facilitates the setting of values and troubleshooting in a simple and well-structured way

The built-in copper coil provides copious amounts of hot water. The CTC EcoZenith i250 also has a so-called summer-time basement heating function and a floor heating block, which maximises the temperature supplied to the floor circuits. Using the integrated night reduction function, you can set and change the temperature in the house during the day, from one day to the next.

Easily accessible electrical components, along with effective troubleshooting functions in the control program, make the CTC EcoZenith i250 easy to service. It comes with a room sensor as standard, which is equipped with an LED which flashes in the event of a fault.

If you want to supplement your CTC EcoZenith i250 with other heating, you can do this easily thanks to two unique connections. We have decided to call this option Energyflex. With Energyflex you can, for example:

- Charge your heating system with solar energy
- Allow a water-jacketed stove to contribute heat
- Connect a pool exchanger to heat up a swimming pool

Check list

The check list must be completed by the installer.

- In the event of a service, this information may be called for.
- Installation must always be done according to the installation and maintenance instructions.
- Installation must always be carried out in a professional manner.
- Following installation, the unit must be inspected, functional checks performed and the customer informed.

The points below should be checked off.

Pipe installation

- ☐ CTC EcoZenith i250 filled, positioned and adjusted in the correct manner according to the instructions.
- ☐ CTC EcoZenith i250 positioned so that it can be serviced.
- ☐ The radiator pump's capacity for the required flow.
- ☐ Open radiator valves and other relevant valves.
- ☐ Tightness test.
- ☐ Bleeding and pressurising the system.
- ☐ Safety valve function test.
- ☐ The waste pipe is connected to the draining gutter.

Electrical installation

- ☐ Power switch
- ☐ Correct tight wiring
- ☐ Requisite sensors for applicable system
- ☐ Outdoor sensor
- ☐ Room sensors (optional)
- ☐ Accessories

Information for the customer (adapted to current installation)

- ☐ Start-up with customer/installer.
- ☐ Menus/controls for selected system
- ☐ Installation and maintenance manual supplied to the customer
- ☐ Checks and filling, heating system
- ☐ Trimming information, heat curve
- ☐ Alarm information
- ☐ Mixing valve
- ☐ Safety valve function test
- ☐ Guarantee and insurance
- ☐ Information on procedures for fault registration

Date / Customer

Date / Installer

Important to remember!

Check the following points in particular at the time of delivery and installation:

- The product must be transported and stored in an upright position. When moving the product, it can be placed temporarily on its back.
- Remove the packaging and check before installation that the product has not been damaged in transit. Report any transport damage to the carrier.
- Place the product on a solid foundation, preferably made of concrete. **If the product needs to be placed on a soft carpet, base plates must be placed under the adjustable feet.**
- Remember to leave a service area of at least 1 m in front of the product.
- The product must not be placed below floor level either.
- On installation in a newly built dwelling, the regulations of the Swedish National Board of Housing, Building and Planning (Boverket) must be adhered to when setting maximum power output. The installer must key in the four figure code 8818 under the menu: Service/Factory settings coded, within one week – this locks maximum power.

Safety Instructions

The following safety instructions must be observed when handling, installing and using the product:

- Close the safety switch before doing any work on the product.
- The product must not be flushed with water.
- When handling the product with a hoist ring or similar device, make sure that the lifting equipment, eyebolts, etc. are not damaged. Never stand under the hoisted product.
- Never jeopardize safety by removing bolted covers, hoods or similar.
- Never jeopardize safety by deactivating safety equipment.
- Any work done on the product's electrical system should be done by a qualified professional.
- Safety valve check:
  - The safety valve for the boiler/system and domestic hot water (DHW) must be checked on a regular basis. See the chapter on Operation and maintenance.

! If these instructions are not followed when installing, operating and maintaining the system, Enertech's commitment under the applicable warranty terms is not binding

1. Your home's heating installation

The House Heating Curve

The heating curve is the central part of the product's control system. It is the heating curve which determines the compensated flow temperature requirements for your property dependent upon the outdoor temperatures. It is important that the heating curve is correctly adjusted, so that you achieve the best operation and economy possible.

One property requires a radiator temperature of 30 °C when the outdoor temperature is 0 °C, whilst a different property requires 40 °C. The difference between different properties is determined by the radiator surface area, the number of radiators and how well insulated the house is.

! The set heating curve is always given priority. The room sensor can only increase or decrease the compensated flow temperature to a certain extent above the set heating curve. Where operating without a room sensor, the selected heating curve determines the flow temperature supplied to the radiators purely from the outside temperature reading.

Adjustment of Default Values for the Heating Curve

You define the heating curve yourself for your property by setting two values in the product control system. This is achieved by selecting the options Inclination or Adjustment under the Installer/Settings/Radiator system menu. Ask your installer to help you set these values.

It is extremely important to set the heating curve and, in some cases, unfortunately, this process may take several weeks. The best way of doing this, upon the initial start-up, is to select operation without any room sensor. The system then operates using the outdoor temperature reading and the property's heating curve only.

During the adjustment period it is important that:

- the night reduction function is not selected.
- all thermostat valves on the radiators be fully opened.
- the outdoor temperature is not higher than +5 °C. (If the outdoor temperature is higher when the system is installed, use the factory set curve until the outdoor temperature falls to a suitable level.)
- the radiator system is operational and correctly adjusted between different circuits.

Appropriate Default Values

During installation you can seldom achieve a precise setting for the heating curve instantly. In this case, the values given below may provide a good starting point. Radiators with small heat-emission surfaces require a higher primary flow temperature. You can adjust the gradient (heating curve gradient) for your heating system under the Installer/Settings/Radiator system menu.
Recommended values are:

Floor heating only	Inclination 35
Low temperature system (well insulated houses)	Inclination 40
Normal temperature system (factory setting)	Inclination 50
High temperature system (older houses, small radiators, poorly insulated)	Inclination 60

Adjusting the heating curve

The method described below can be used to adjust the heating curve correctly.

Adjustment if it is too cold indoors

- If the outdoor temperature is **lower** than 0 degrees:
  Increase the Inclination value by a couple of degrees.
  Wait 24 hours to see if any further adjustment is required.
- If the outdoor temperature is **higher** than 0 degrees:
  Increase the Adjustment value by a couple of degrees.
  Wait 24 hours to see if any further adjustment is required.

Adjustment if it is too warm indoors

- If the outdoor temperature is **lower** than 0 degrees:
  Decrease the Inclination value by a couple of degrees.
  Wait 24 hours to see if any further adjustment is required.
- If the outdoor temperature is **higher** than 0 degrees:
  Decrease the Adjustment value by a couple of degrees.
  Wait 24 hours to see if any further adjustment is required.

! If the values set are too low, this may mean that the desired room temperature is not being reached. You then need to adjust the heating curve, as necessary, following the method shown above.
When the basic values have been set more or less correctly, the curve can be finely adjusted directly using the Room temp. shown on the home menu screen.

Description of inclination and adjustment

Inclination 50:
The value set is the outgoing temperature of the water supplied to the radiators at an outdoor temperature of –15 °C, e.g. 50 °C. A lower value is selected where a radiator system has large radiator areas (a low temperature system). Floor heating systems require low temperatures. A low value should therefore be selected. The value must be increased for high temperature systems to achieve a high enough indoor temperature.

Adjustment 0:
The adjustment means that the flow temperature can be raised or lowered at a specific outdoor temperature.
Adjustment 0 means 50 °C primary flow when the outside temperature is -15 °C.
Adjustment -5 means 45 °C primary flow when the outside temperature is -15 °C.

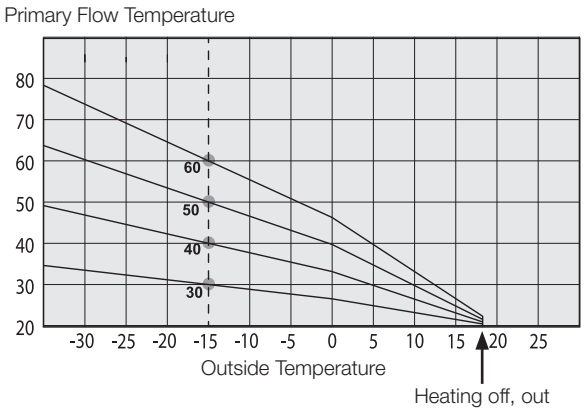
For example:
Inclination 50 means that the temperature of the water supplied to the radiators will be 50 °C when the outdoor temperature is –15 °C (if adjustment is set to 0). If the adjustment is set to +5, the temperature will be 55 °C instead. The curve is increased by 5 °C at all temperatures, i.e. it is parallel displaced by 5 °C.

Examples of Heating Curves

You can see in the diagram below how the heating curve changes with different Inclination settings. The gradient of the curve shows the temperatures that the radiators require at different outdoor temperatures.

Curve Inclination

The inclination value which is set is the primary flow temperature when the outside temperature is –15 °C.

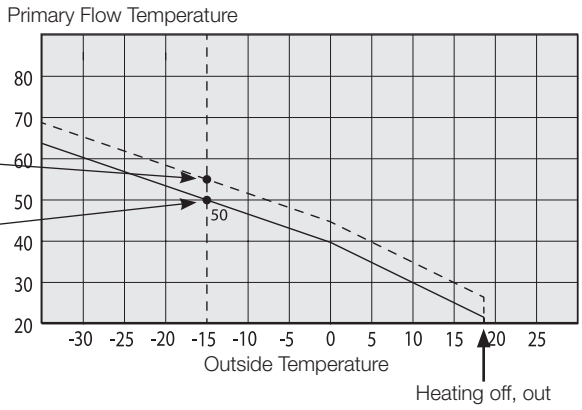


Adjustment

The curve can be parallel displaced (adjusted) by the desired number of degrees to adapt to different systems/ houses.

Inclination 50 °C
Adjustment +5 °C

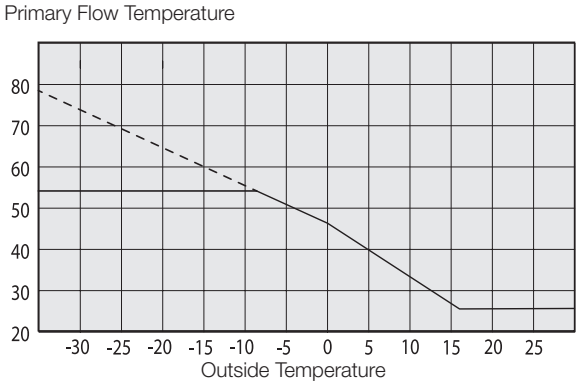
Inclination 50 °C
Adjustment 0 °C



An example

Inclination 60 °C
Adjustment 0 °C

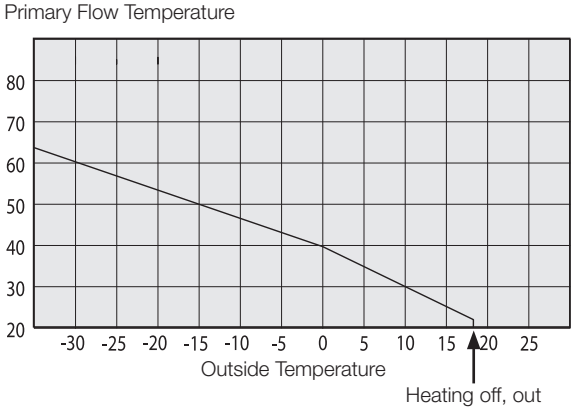
In this example, the maximum outgoing primary flow temperature is set at 55 °C.
The minimum permitted primary flow temperature is 27 °C (e.g. summer-time basement heating or the floor circuits in a bathroom).



Summer-time operation

All properties have internal heat gains (lamps, oven, personal heat etc.), which means that the heating can be switched off when the outdoor temperature is lower than the desired room temperature. The better insulated the house is, the earlier the heating from the heat pump can be switched off.

The example shows the product set at the default value of 18 °C. This Heating off value can be changed under the Installer/Settings/Radiator system menu.
When the heat is switched off in this way, the radiator pump stops and the mixing valve is shut down. The heating starts up automatically when it is required again.



2. Technical data

2.1 Table 400V 3N~

Electrical Data		CTC EcoZenith i250 H	CTC EcoZenith i250 L
Electrical data		400V 3N~	
Rated power	kW	15.04	15.04
Immersion heater (steps of 0,3 kW)	kW	0 - 15.0	
Max immersion heater output @ fuse size 16 / 20 / 25 A	kW	9+6 (3)	9+6 (3)
IP class		IPX1	

Heating system		CTC EcoZenith i250 H	CTC EcoZenith i250 L
Water volume. thermal store (V)	l	223	
Max. operating pressure. thermal store (PS)	bar	2,5	
Max. temperature. thermal store (TS)	°C	110	
Pressure drop for mixing valve heating		See pressure drop diagram in the Pipe installation chapter	

Hot water system		CTC EcoZenith i250 H	CTC EcoZenith i250 L
Water volume, hot water coil (V)	l	5,7	
Max. operating pressure, hot water coil (PS)	bar	10	
Max. temperature, hot water coil (TS)	°C	110	

Other data		CTC EcoZenith i250 H	CTC EcoZenith i250 L
Weight	kg	182	167
Width x Height x Depth	mm	595x1904x672	595x1654x672
Minimum ceiling height	mm	1925	1696

2.2 Table 230 V 1N~

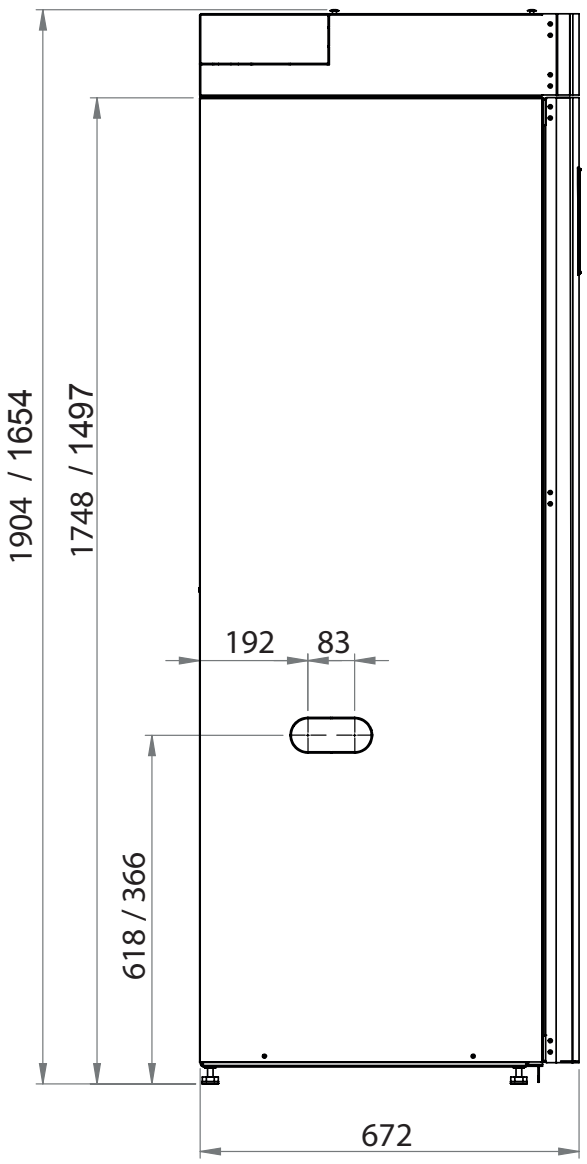
Electrical Data		CTC EcoZenith i250 H	CTC EcoZenith i250 L
Electrical data		230V 1N~	
Rated power	kW	12,04	12,04
Immersion heater (steps: 3, 5, 7, 9, 12 kW)	kW	0-12	
Max immersion heater output @ fuse size 16 / 20 / 25 A	kW	9+3	9+3
IP class		IPX1	

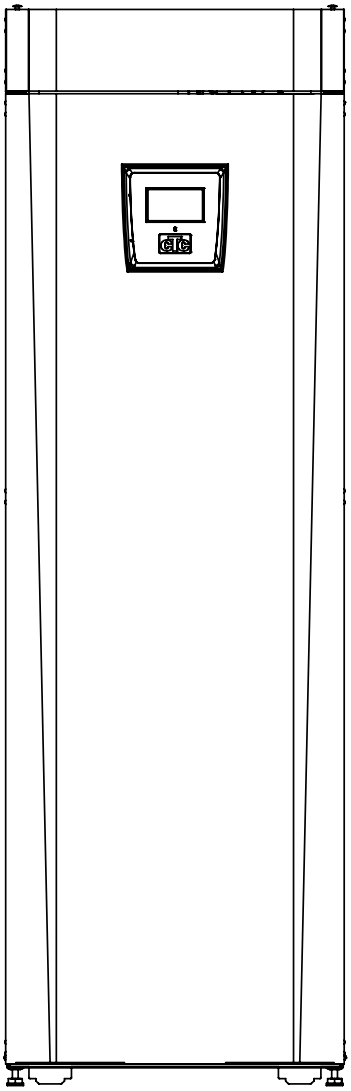
Heating system		CTC EcoZenith i250 H	CTC EcoZenith i250 L
Water volume. thermal store (V)	l	223	
Max. operating pressure. thermal store (PS)	bar	2,5	
Max. temperature. thermal store (TS)	°C	110	
Pressure drop for mixing valve heating		See pressure drop diagram in the Pipe installation chapter	

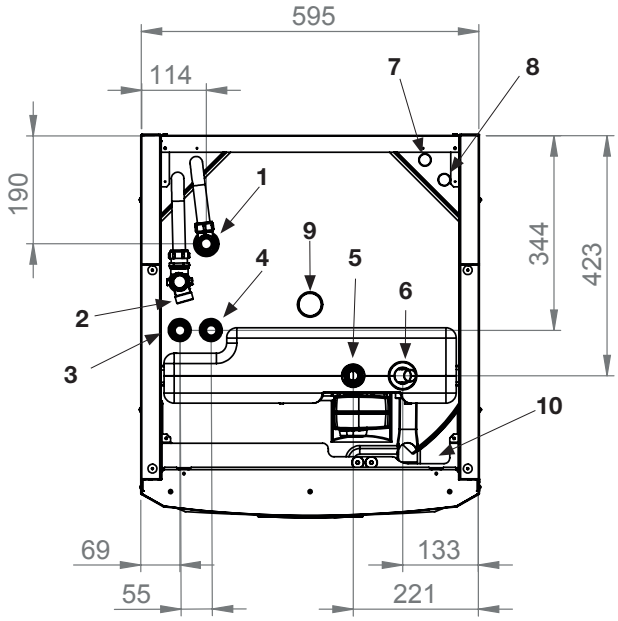
Hot water system		CTC EcoZenith i250 H	CTC EcoZenith i250 L
Water volume, hot water coil (V)	l	5,7	
Max. operating pressure, hot water coil (PS)	bar	10	
Max. temperature, hot water coil (TS)	°C	110	

Other data		CTC EcoZenith i250 H	CTC EcoZenith i250 L
Weight	kg	182	167
Width x Height x Depth	mm	595x1904x672	595x1654x672
Minimum ceiling height	mm	1925	1696

3. Measurements



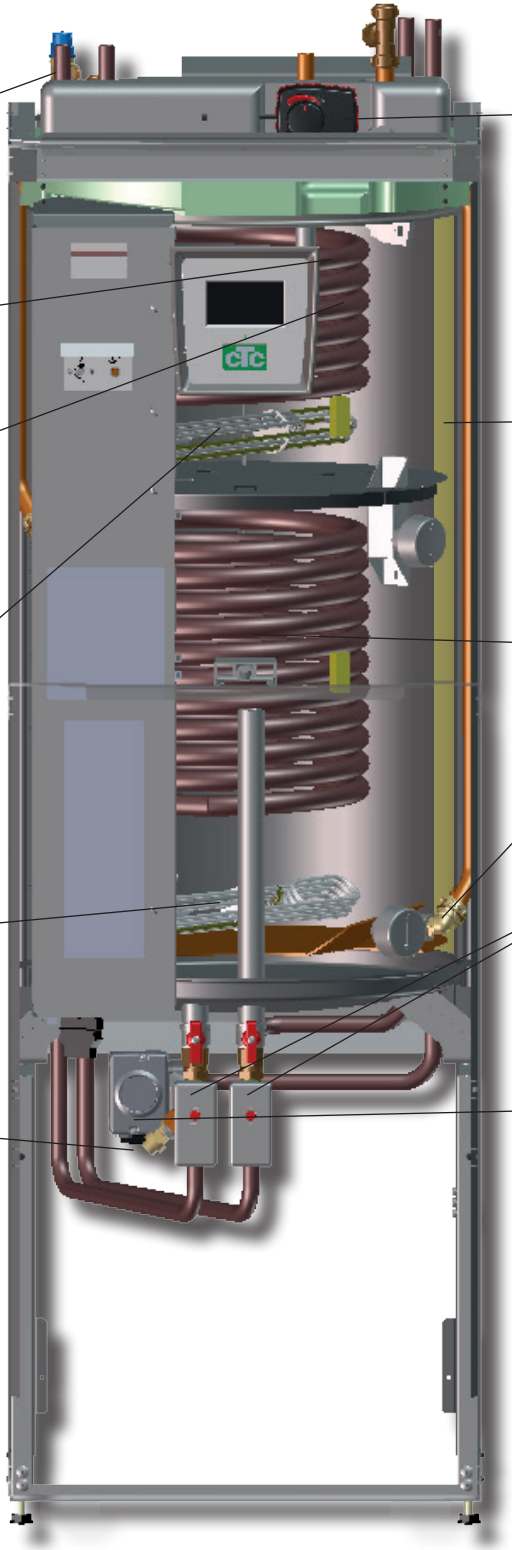




1. Bleeding
2. Safety valve/connection waste pipe 3/4” 22
3. Cold water connection Ø22
4. Hot water Ø22
5. Radiator primary flow 22 compression
6. Radiator return Ø22 mm/expansion connection
7. From heat pump (CTC EcoZenith i250L)
8. To heat pump (CTC EcoZenith i250L)
9. Lifting sleeve 3/4” BSP
10. Fittings for connecting external systems

4. CTC EcoZenith i250 design

The picture below shows the basic construction of CTC EcoZenith i250.
If a heat pump is connected, the energy in the air or bedrock/ground is drawn up by the cooling system. The compressor then increases the temperature to a usable level. Afterwards it releases the energy for the heating system and hot water. The built-in immersion heaters help when additional heat is needed or when a heat pump is not connected.



Fresh Water Connections
The property's fresh water supply is connected here. The cold water is fed down and heated in the lower part of the coiling.

Upper part
In the upper part of the coil the hot water is then heated to the desired temperature.

Finned Coil for Hot Water
The EcoZenith i250 is equipped with a well-dimensioned finned coil made of copper. Since hot water is not stored, there is no risk of legionella bacteria.

Upper immersion heater
Built-in upper immersion heater. When connected to a heat pump, the immersion heater acts as additional heat.

Lower immersion heater
Built-in lower immersion heater. Not used in normal operation when the heat pump is connected.

Draining/expansion vessel connection
Two connections in the lower part of the product where water from the boiler and radiator system can be drained.

Bivalent Mixing Valve
The automated mixing valve ensures that an even heat is continuously supplied to the radiator system.

Insulation
The heat pump's tank is insulated with die-cast polyurethane foam for minimal heat loss.

Lower part
In the lower part of the coil the hot water is pre-heated by the water heated by the heat pump. The major section of the coil is located in this part.

Expansion connection
15 mm.

Diverting valve
The heated water from the heat pump heats up the upper or lower part of the tank alternately.

Heat medium pump
The adjustable-speed charge pump transports the cold water from the boiler to the heat pump where the energy from the air or bedrock/ground is drawn up and taken back to the boiler.

5. Parameter list

Radiator system	Factory value	User (set) value
Max. primary flow °C	55	
Min primary flow °C	Off	
Heating off, out °C	18	
Heating off, time	120	
Inclination °C	50	
Adjustment °C	0	
Room temp red	-2	
Primary flow reduced	-3	

Heat pump		
Compressor	Blocked	
Brine pump on 10 days	0	
Tariff HP	Off	
Minimum operating time	6	

Immersion heaters	Factory value	User (set) value
Boiler upper °C	50	
Boiler upper add °C	57	
Boiler XVV °C	60	
Boiler upper max. kW	5.5	
Boiler low °C	55	
Boiler low kW	6.0	
Delay mixing valve	180	
Main fuse A	20	
Input voltage	3x400 V	
Tariff EL	Off	

Upper tank	Factory value	User (set) value
Stop temp HP °C	Max.	
Start/stop diff °C	7	
Max. time upper tank	20	
Max. time lower tank	40	

6. Control system

The CTC EcoZenith i250 has an advanced yet straightforward control system with a touchscreen on which all settings are entered directly.

The CTC EcoZenith i250 control system:

- Monitors all system tank, heat pump and heating system functions
- Permits individual settings
- Displays desired values, such as temperatures, operation times, energy consumption and fault signals.
- Facilitates the setting of values and troubleshooting in a simple and well-structured way.

Factory values

The CTC EcoZenith i250 is delivered with set factory values which are suitable for a standard house with a standard radiator system. The CTC EcoZenith i250 automatically adjusts the water temperature to the primary flow's current heating requirement. This is monitored by the control system, which continuously ensures that you are provided with optimum function and economy. These values are easy to change as and when required. Ask your installer to help you determine the correct values.

Heat pump

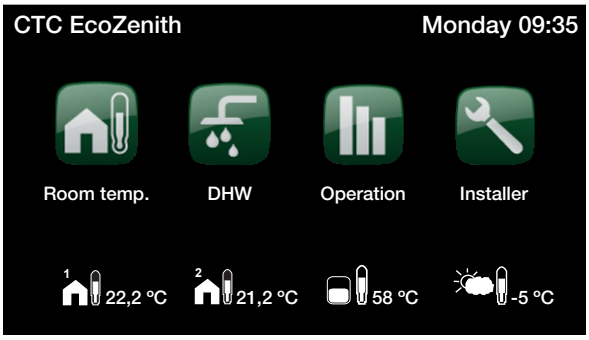
On delivery the CTC EcoZenith i250 is ready for connection to a CTC heat pump, CTC EcoAir 400 outdoor air heat pump or CTC EcoPart 400 bedrock/ground source heat pump.

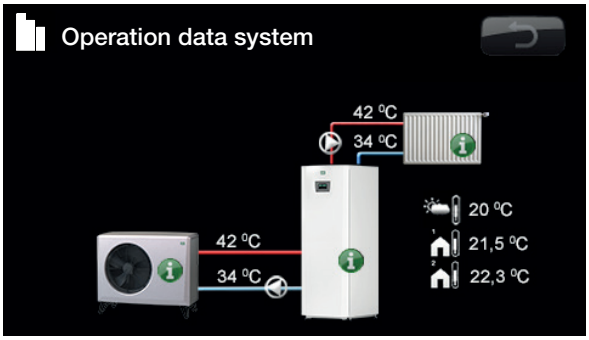
This means that the control system already contains all the controls for the heat pump. When the heat pump is defined, the EcoZenith i250 automatically goes to heat pump operation. Once this has taken place the menus for the heat pump are displayed. On delivery the compressor is blocked and must be set to permitted. This is done under the Installer/Settings/Heat pump menu.

Menu structure

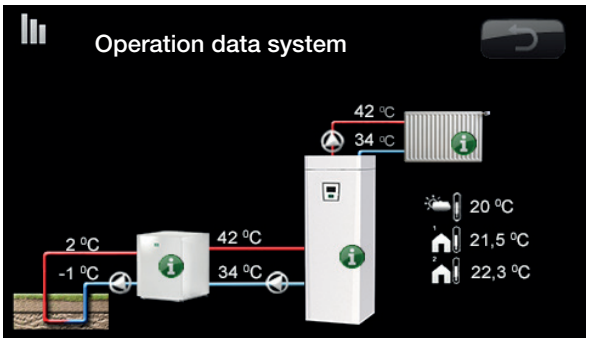
The product's menus are described on the following pages. First there is an overview and then each menu is described in detail.

Start menu





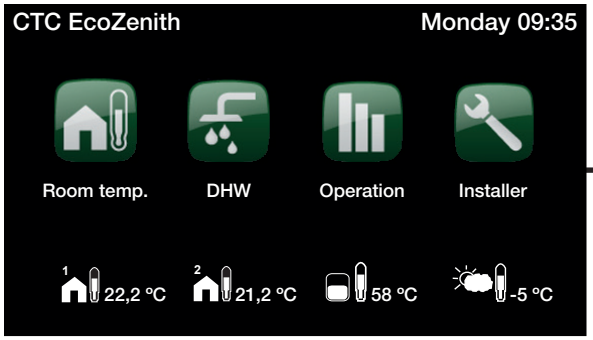
The screen shows operating information with the CTC EcoAir heat pump connected.



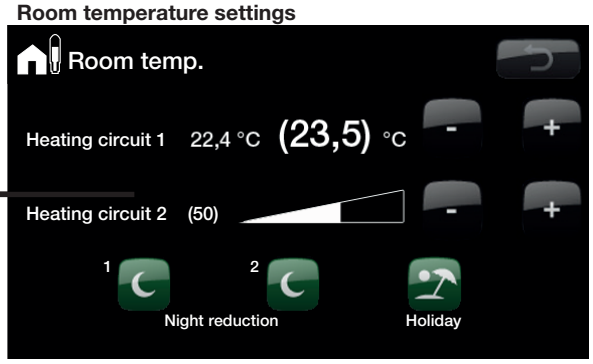
The screen shows operating information with the CTC EcoPart heat pump connected.

7. Menu overview

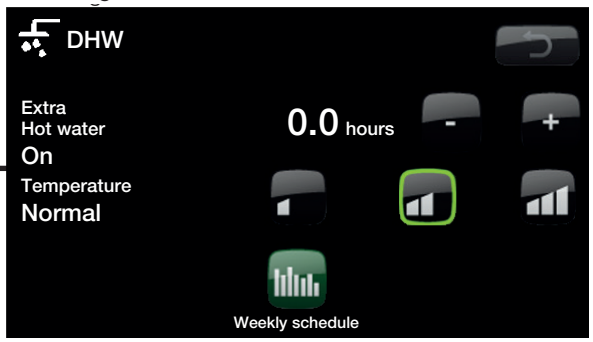
Start menu



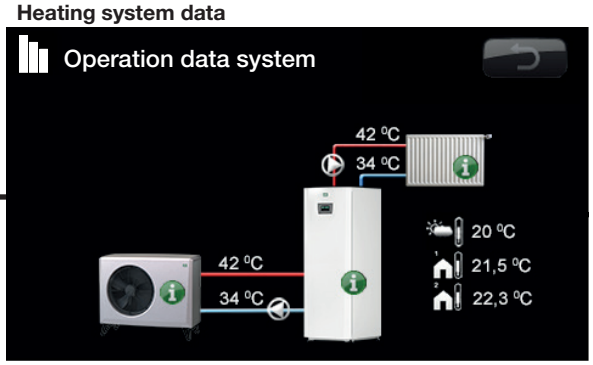
Room temperature settings



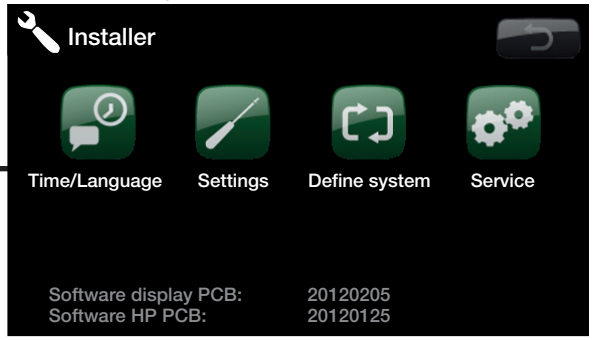
Selecting DHW comfort



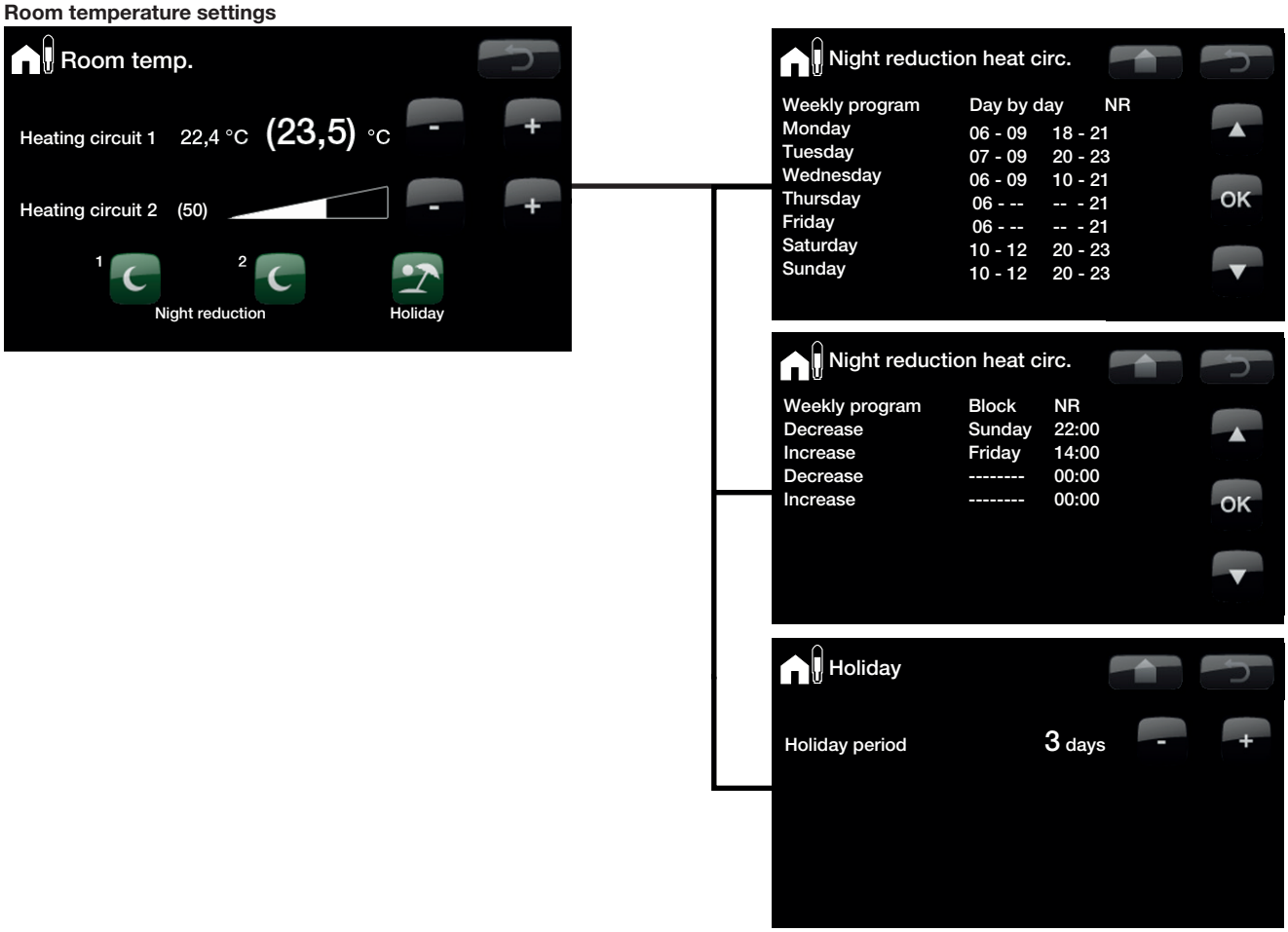
Heating system data



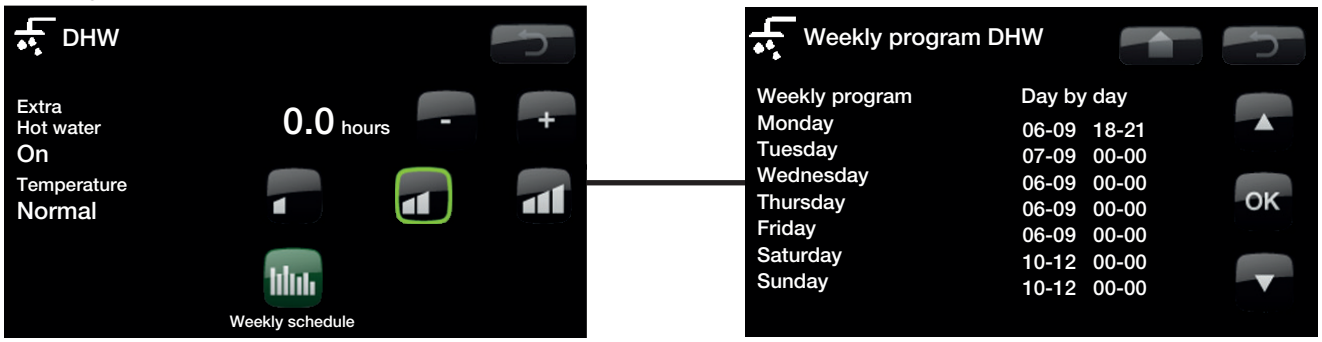
Installer settings menu



Room temperature settings

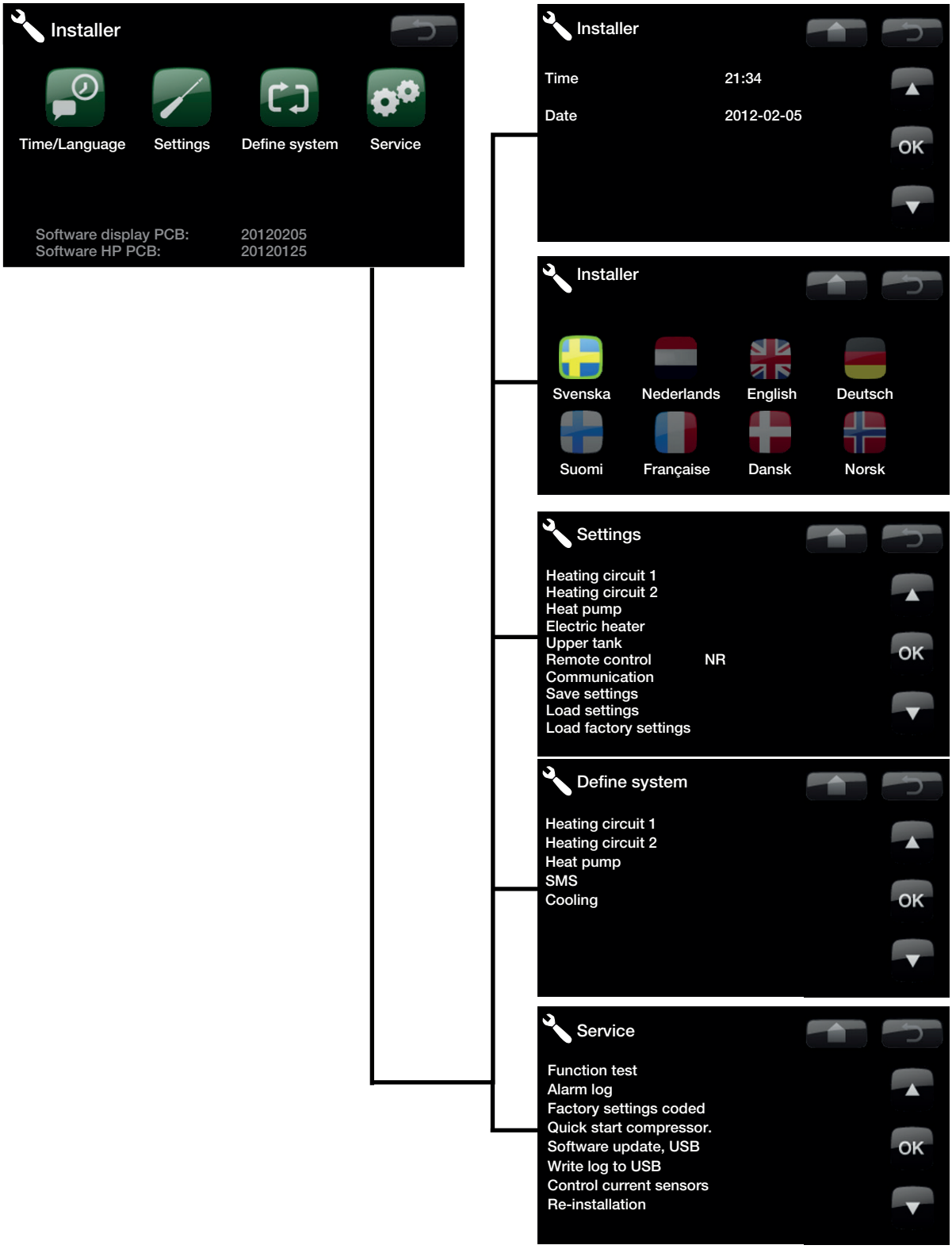

Room temp.
Heating circuit 1 22,4 °C (23,5) °C
Heating circuit 2 (50)
1
2
Night reduction
Holiday
Night reduction heat circ.
Weekly program Day by day NR
Monday 06 - 09 18 - 21
Tuesday 07 - 09 20 - 23
Wednesday 06 - 09 10 - 21
Thursday 06 - -- -- - 21
Friday 06 - -- -- - 21
Saturday 10 - 12 20 - 23
Sunday 10 - 12 20 - 23
OK
Night reduction heat circ.
Weekly program Block NR
Decrease Sunday 22:00
Increase Friday 14:00
Decrease -------- 00:00
Increase -------- 00:00
OK
Holiday
Holiday period 3 days

Selecting DHW comfort

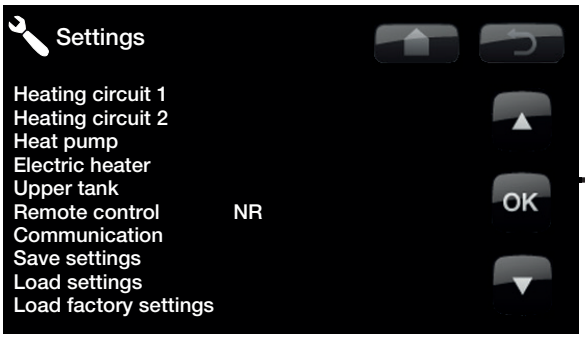


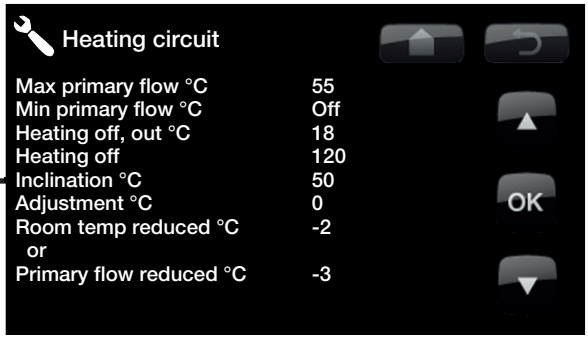
Heating system data

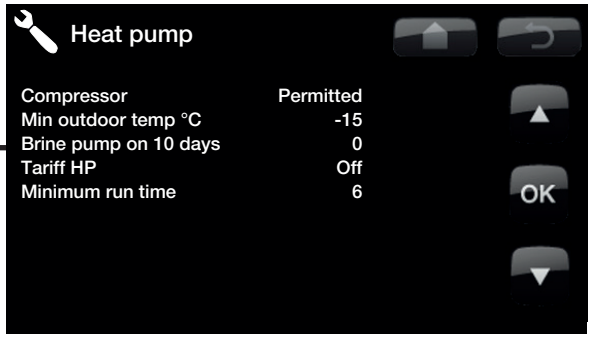
Installer settings menu

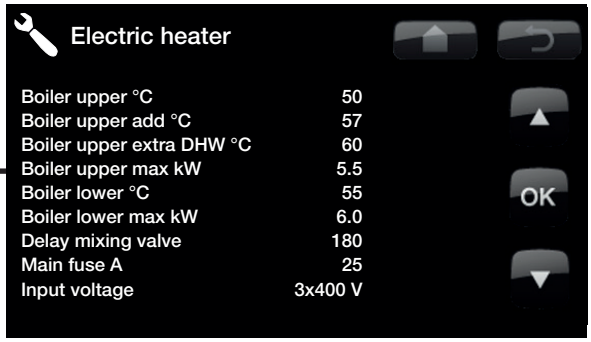


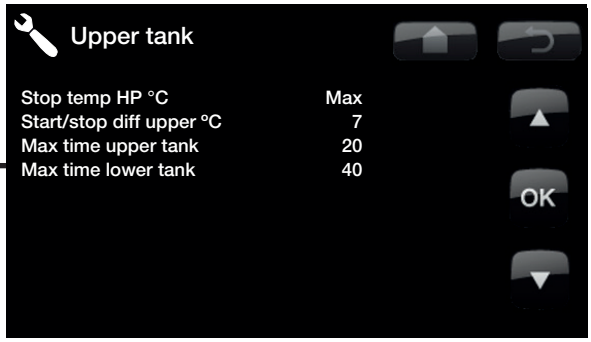
Settings menu

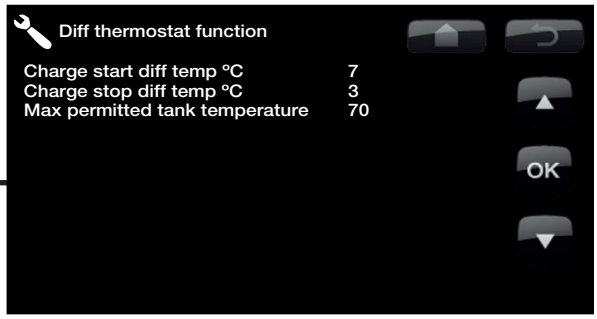




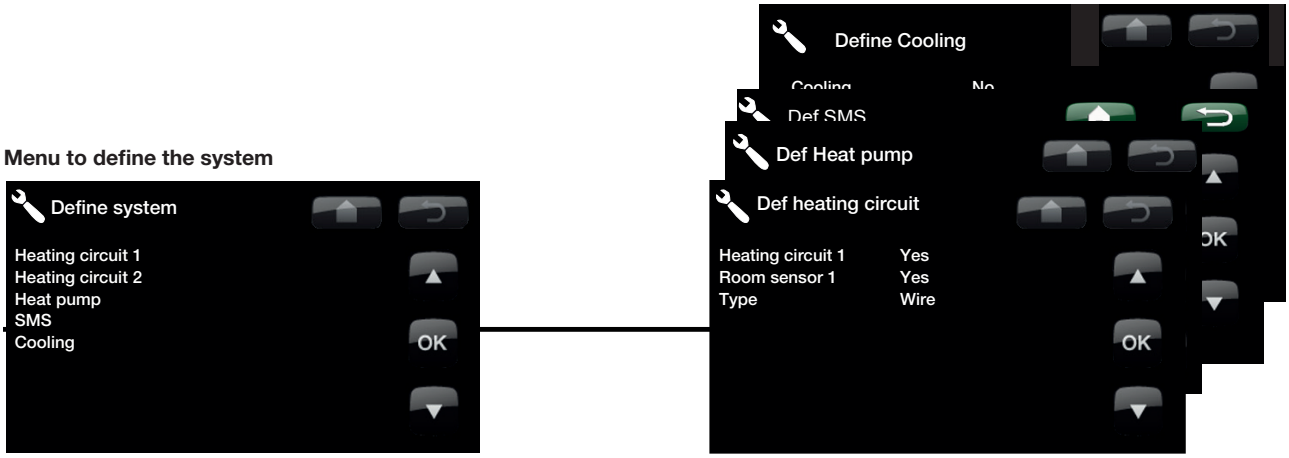



Electric heater
Boiler upper °C 50
Boiler upper add °C 57
Boiler upper extra DHW °C 60
Boiler upper max kW 5.5
Boiler lower °C 55
Boiler lower max kW 6.0
Delay mixing valve 180
Main fuse A 25
Input voltage 3x400 V
OK

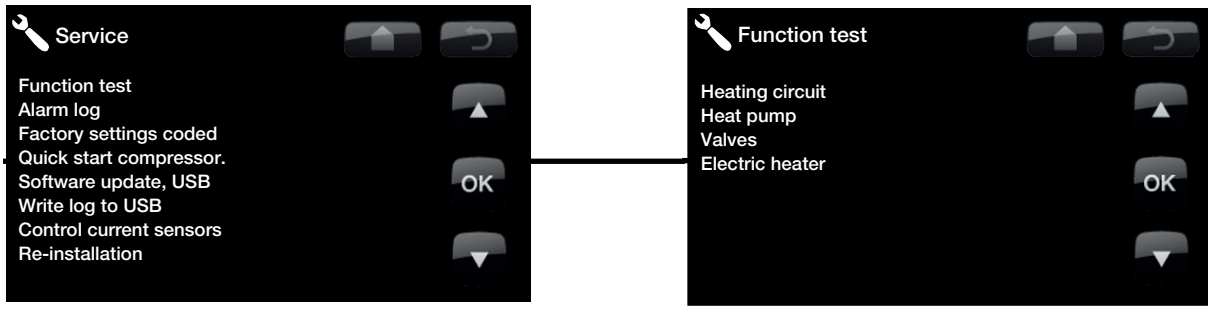




Menu to define the system

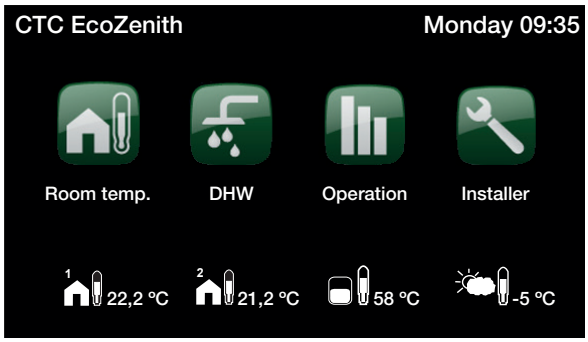


Service menu



8. Detail Description Menus

All the settings can be configured directly on screen using the well-structured control panel. The large icons operate as buttons on the touch display.
Operational and temperature information is also displayed here. You can easily enter the different menus to find information on the operation or to set your own values.



8.1 Start menu

This menu is the system's start menu. This provides an overview of the current operational data.
The system returns to this menu if no buttons are pressed within 10 minutes. All other menus can be accessed from this menu. NOTE: Some menus are only shown if a heat pump is installed.

8.2 Description of icons

Room temp.
Settings for raising or lowering the temperature indoors and also for scheduling temperature changes.

DHW
Settings for DHW production.

Operation
This displays current operational data for both your heating system and heat pump. Historical operational data is also available.

Installer
This option is used by the installer to configure the settings and servicing for your heating system.

Room temp. Radiator system 1
If radiator system 1 is defined, the current room temperature is displayed here.

Room temp. Radiator system 2
If radiator system 2 is defined, the current room temperature is displayed here.

Tank temperature
This displays the current temperature in the upper part of the tank.

Outdoor temperature
This displays the current outdoor temperature.

Home
The Home button takes you back to the Start menu.

Return
The Return button takes you back to the previous level.

OK
The OK button is used to mark and confirm text and options in the menus.

Night reduction
This schedules a temperature reduction at night if selected.

Holiday
You can use this to reduce the room temperature permanently, e.g. during holidays when the house is unoccupied.

Weekly program
This is used to reduce the temperature for a few days, for instance if you commute every week.

Stored operation data
This displays historical data.

Time/Language
This is used to set the date, time and the language you want the menu to be displayed in.

Settings
The settings for operation of EcoZenith and the system are usually configured by the installer.

Define system
The heating system's structure can be adjusted/modified using this option.

Service
Advanced settings are configured by the appropriate technical person.

8.3 Room temp.

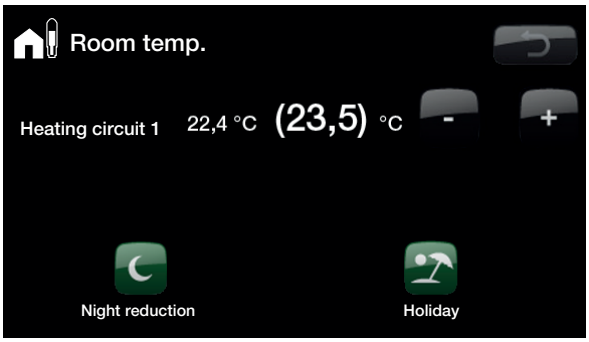
This is used to set the desired room temperature. Use the plus and minus buttons to set the temperature you want, which gives you the “setpoint” temperature, in brackets. You can see the current value next to the brackets.

If two radiator systems are installed, the values for both are displayed.

If you want to schedule a temperature reduction, you can continue to the Night reduction or Holiday sub-menus.

You can select Room sensor No under the Installer/ Define system/Radiator system menu. This can be done if the room sensor is poorly positioned, if the floor heating system has a separate room sensor or if you use a fire place or open stove. The alarm LED on the room sensor still functions as normal.

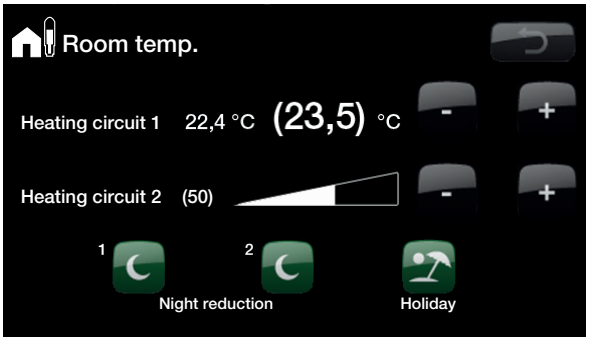
If you use the fire or open stove only occasionally, the firing process can affect the room sensor and reduce the temperature supplied to the radiators. It can then get cold in the rooms in other parts of the house. The room sensor can temporarily be deselected during the firing process. The EcoZenith i250 then provides heating to the radiators using the set heating curve. The radiator thermostats reduce the heating supplied to the section of the house where a fire is burning.



The example above shows that the room temperature is 22.4 °C, but the desired value (setpoint) is 23.5 °C.

8.3.1 Setting temperature without a room sensor

If a room sensor has not been installed (selected in the Settings menu), you use this option to adjust the room temperature by trimming the flow temperature. If this range is not sufficient, the basic setting must be adjusted under the Installer/Settings/Radiator system menu.
Change the value in small steps each time (approx. 2 to 3 steps) and wait for the result (approx. one day), as there is a delay in the system responding.
Several adjustments may be necessary at different outdoor temperatures, but you will gradually achieve the right setting that will not need to be changed.



The example above shows how it operates with two radiator systems. Radiator system 1 with a room sensor and radiator system 2 without one.

8.3.2 Outdoor Sensor/Room Sensor Faults

If a fault occurs with an outdoor sensor, an outdoor temperature of -5 °C is simulated so that the house does not get cold. The product's alarm is triggered. If a fault occurs with a room sensor, the EcoZenith i250 automatically switches to operating according to the set curve. The product's alarm is triggered.

> **!** The thermostats of the radiators must be fully open and well operating when the system is tuned.

8.3.3 Night reduction temperature

You use this menu to activate and set a reduction in the temperature at night. A night reduction means that you reduce the temperature indoors during scheduled periods, for example, at night or when you are working.

The value by which the temperature is reduced, Room temp. red, is set under Installer/Settings/Radiator system/Factory value: -2°C.

The options are Off, Day by day or Block. If you select Off, no reduction is made at all.

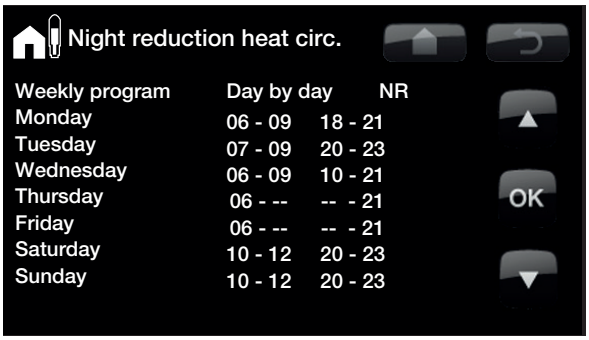
Day by day menu

You use this menu to schedule a reduction on the days of the week. This schedule is repeated every week.

The time set is when you want the temperature to be normal. The night reduction function is activated during the rest of the time.

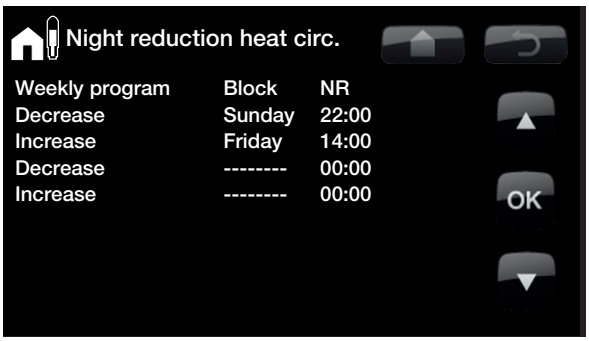
Block

This menu allows you to set a reduction for a few days during the week, for example, if you are working elsewhere on weekdays and at home at weekends.



On Monday morning at 6 am the temperature is increased to normal; at 9 am it is reduced to the set night reduction temperature. At 6 pm the temperature is increased again until 9 pm when the night reduction function reduces it again.

> **!** The time set is when you want the temperature to be normal. The night reduction function is activated during the rest of the time. Reducing a heat pump's temperature at night is a comfort setting which generally does not reduce energy consumption.



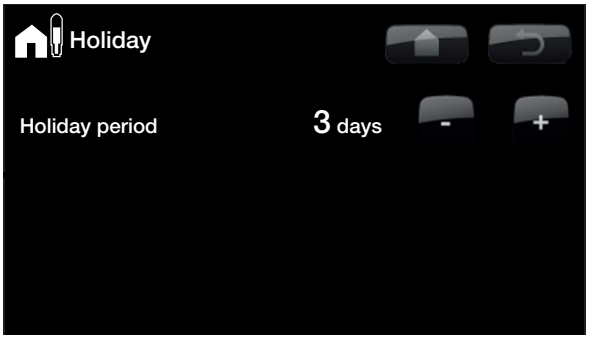
On Sunday at 10 pm the temperature is reduced with the value set for Room temp. being reduced. On Friday at 2 pm the temperature is increased to the set value again.

8.3.4 Holiday

You use this option to set the number of days that you want the set night reduction temperature to be constantly reduced. For example, if you want to go on holiday.

You can apply this setting for up to 300 days.

The period starts from the time you set this parameter for.



The value by which the temperature is reduced, Room temp. red, is set under Installer/Settings/Radiator system/
Factory value: -2°C.

8.4 DHW

You use this to set the DHW comfort level you want and extra DHW.

Temperature

You set the values for this option which apply to the CTC EcoZenith i250's normal operation. There are three modes:

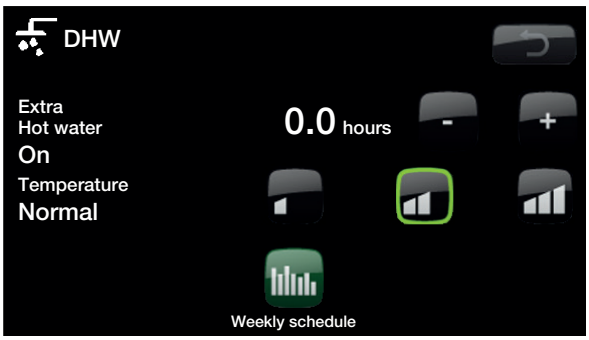
Economic – Small hot water requirement.

Normal – Normal DHW requirement.

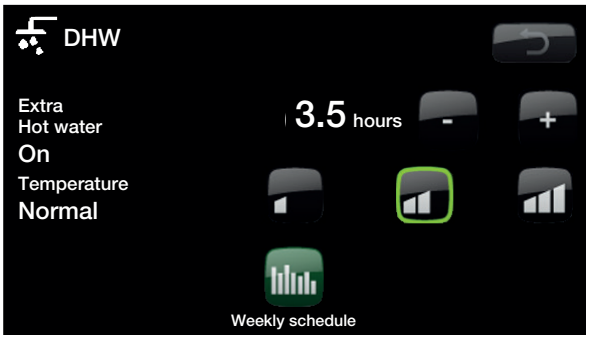
Comfort – Large DHW requirement.

Extra DHW **(On/Off)**

You select this option if you want to activate the Extra DHW function. When this function is activated, EcoZenith i250 starts producing extra hot water immediately. You also have the option to schedule DHW production for certain times using the Weekly program function, which is recommended.



Tip: Start by setting to Economic and if you find that you are not getting enough hot water, increase it to Normal, and so on.



The example above shows that Extra DHW is set to On for 3.5 hours.

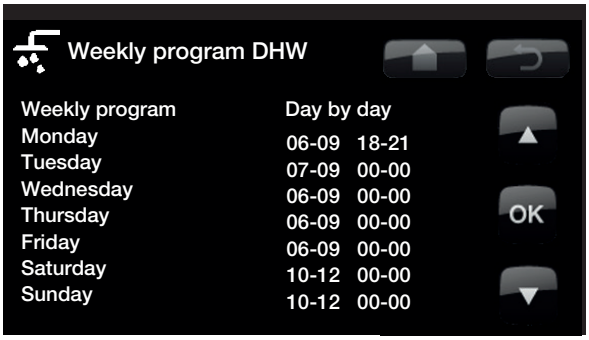
8.4.1 Weekly program DHW

You can use this menu to schedule periods during weekdays when you want extra hot water. This schedule is repeated every week. The screen shows the factory values, which can be changed. If you want an additional period some day, e.g. in the evening, you can program recurring times.

The options are Off or Day by day.

Off – No scheduled DHW production.

Day by day – A weekly schedule which you program yourself. This is used if you always know when you repeatedly need extra hot water, for instance, during the morning and evening.



On Monday morning at 6 am the system starts producing more hot water until 9 am when the temperature returns to normal again. There is a further increase between 6 pm and 9 pm.

! Tip: Set the time approx. 1 hour earlier than you need the hot water as it take some time to heat up the water.

8.5 Operation

This menu displays current temperatures and the operational data for your heating system.

Primary flow radiators
The temperature of the primary flow to the house's radiators is shown above the CTC EcoZenith i250 (42°C). This value will vary during the year according to the parameters set and the current outdoor temperature.

Return radiators
The return temperature of the radiator water returning to EcoZenith is also shown above the CTC EcoZenith i250 (34°C). This value will vary during operation according to the parameters set, the radiator system's capacity and the current outdoor temperature.

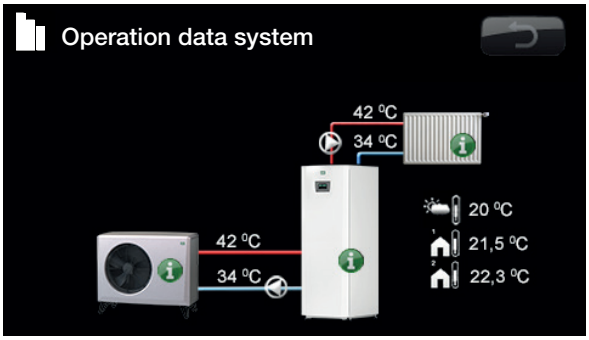
The screen also shows the incoming and outgoing temperatures from the heat pump installed.

HP out
At the right of the heat pump (42°C) the heat pump's outgoing temperature is shown.

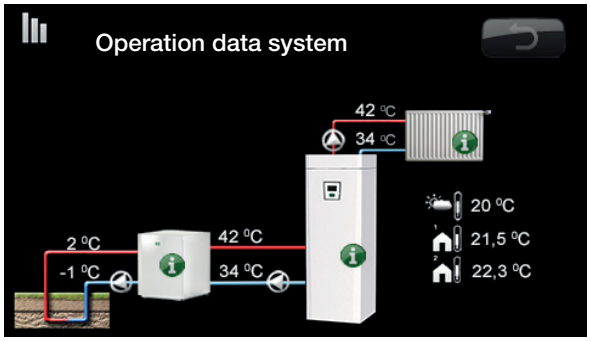
HP in
At the right of the heat pump (34°C) the heat pump's return temperature is shown.

Brine in (CTC EcoPart only)
At the top left of the EcoPart (2°C) the brine's current temperature from the collector to CTC EcoPart is shown.

Brine return (CTC EcoPart only)
The bottom left value (-1 °C) is the return temperature of the brine going back into the collector hose. The values vary during the year according to the heat source's capacity and the energy drawn out.



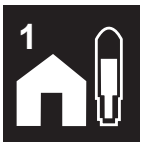
The screen shows operational data with the CTC EcoAir connected. When the pumps are in operation, the pump icons also rotate on screen.



The screen shows operating information with the CTC EcoPart connected. When the pumps are in operation, the pump icons also rotate on screen.

Information
Press the information button to display the operational data for the relevant item.

Current outdoor temperature
Shows the current outdoor temperature.
The product uses this value to calculate the various operational parameters.



Current indoor temperature
Shows the current room temperature (if a room sensor is selected during operation). If two radiator systems are installed, the values for both are displayed.

8.5.1 Operation EcoZenith

This menu displays current temperatures and the operational data for your EcoZenith i250. The first figure is the actual operational value, with the value in brackets being the setpoint which EcoZenith is trying to achieve.

Status

Shows EcoZenith i250's operational status.
The various operational status options are:

- **HP upper tank**
  The heat pump heats up the upper part of the tank (DHW production).
- **HP lower tank**
  The heat pump heats up the lower part of the tank. (Heat production).
- **HP + Add**
  Both the immersion heater and heat pump are operating to heat up the tank.
- **Add**
  Only the immersion heater is heating the tank.

Tank upper °C

Shows the temperature and reference value in the upper part of the tank.

Tank lower °C

Shows the temperature and reference value in the lower part of the tank.

Primary flow °C

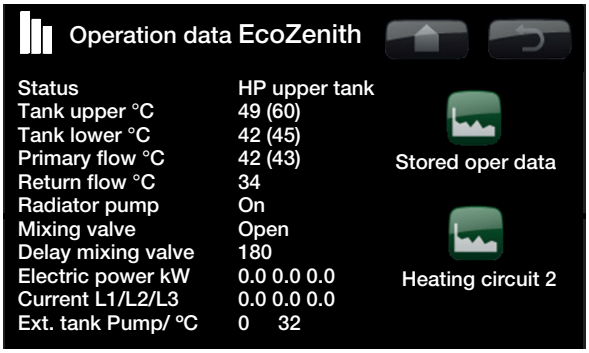
Shows the temperature supplied to the system's radiators, along with the temperature which the system is trying to achieve. This value will vary during the year according to the parameters set and the current outdoor temperature.

Return flow °C

Shows the temperature of the water returning from the radiator system to the CTC EcoZenith i250.

Radiator pump

Shows the radiator pump's operational status.


Operation data EcoZenith
Status HP upper tank
Tank upper °C 49 (60)
Tank lower °C 42 (45)
Primary flow °C 42 (43)
Return flow °C 34
Radiator pump On
Mixing valve Open
Delay mixing valve 180
Electric power kW 0.0 0.0 0.0
Current L1/L2/L3 0.0 0.0 0.0
Ext. tank Pump/ °C 0 32
Stored oper data
Heating circuit 2

Three Current values are displayed when the current transformers (CTs) are connected and identified. If only one figure is displayed:
- connect all three current transformers (CTs).
- then select the option Installer/Service/Control current sensors.

The first figure is the actual operational value, with the value in brackets being the setpoint which CTC EcoZenith is trying to achieve.

Mixing valve

Shows whether the mixing valve increases (opens) or reduces (closes) the heat supplied to the radiators. When the correct temperature has been achieved with the mixing valve, the valve's motor then remains stationary.

Delay mixing valve

A microswitch in the mixing valve's motor ensures that auxiliary heating is not used unnecessarily, for example, when ventilating a room or if the temperature (outdoors) occasionally drops during the night. The mixing valve is delayed for the time period selected before auxiliary heating is used. The screen shows the countdown of the delay in minutes. If "Blocked" is shown, never open the mixing valve to the immersion heaters of the upper tank.

Electric power kW

Shows the boiler's additional power (0 to 9.0 kW + 0 to 6.0 kW).

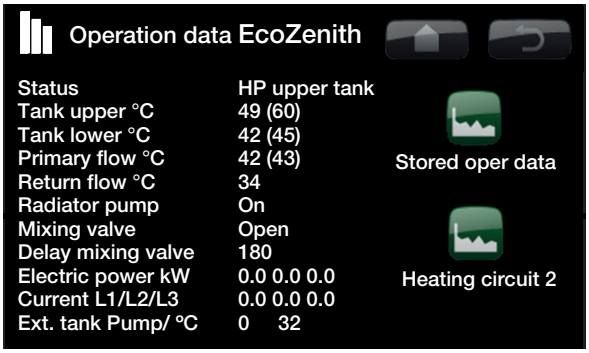
Current L1/L2/L3

Shows the system's total current consumption at the various phases L1/L2/L3, provided that three current sensors have been fitted to the unit's incoming cables. If the current sensors mounting devices are not identified, only the phase with the highest load is displayed.
If the current exceeds the main fuse size, the boiler automatically switches down a power step to protect the fuses, for example, when several high-consumption appliances are being used in the house.

Ext. tank Pump/ºC (Off/On)

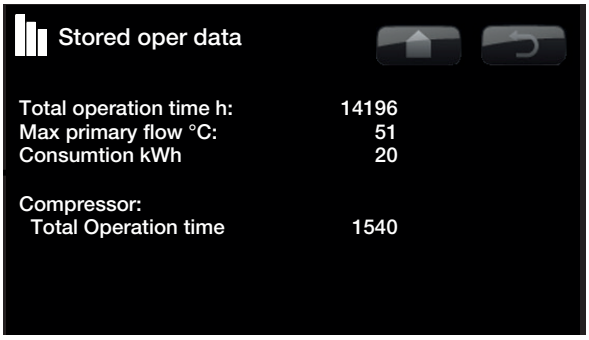
Indicates whether the charge pump (G46) from the external tank is turned on (ON, OFF)

Indicates the temperature in the external tank.


Operation data EcoZenith
Status HP upper tank
Tank upper °C 49 (60)
Tank lower °C 42 (45)
Primary flow °C 42 (43)
Return flow °C 34
Radiator pump On
Mixing valve Open
Delay mixing valve 180
Electric power kW 0.0 0.0 0.0
Current L1/L2/L3 0.0 0.0 0.0
Ext. tank Pump/ °C 0 32
Stored oper data
Heating circuit 2

8.5.2 Stored operation data

This menu shows the operational values for the EcoZenith i250 over a long period.



Total Operating Time h

Shows the total time during which the product has been on.

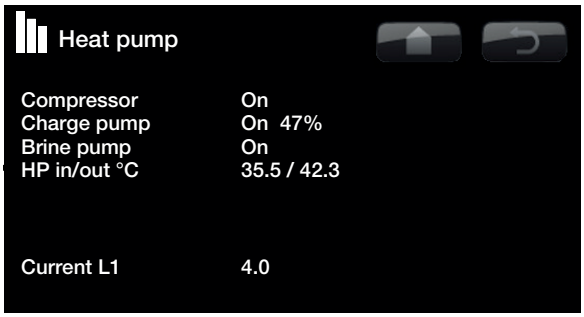
Maximum Primary Flow °C

Shows the highest temperature supplied to the radiators. The value may indicate the radiator system's/ house's temperature requirements. The lower the value during the winter period, the more suitable it is for heat pump operation.

Compressor: Total Operation time

Shows the total time during which the compressor has been on

8.5.4 Operation data heat pump



This menu is intended for servicing and advanced troubleshooting.

Compressor (On....Off)
Shows whether the compressor is operating or not.

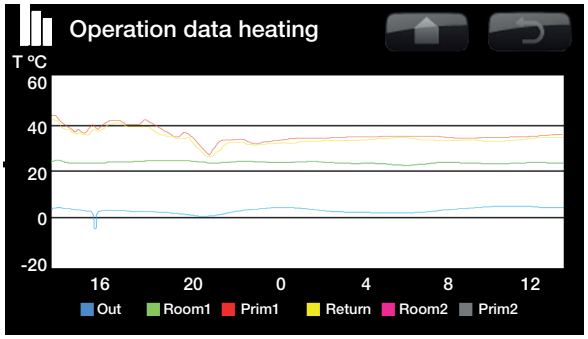
Charge pump (On....Off)
Shows the charge pump's operational status and flow as a percentage.

Brine pump/fan (On....Off)
Shows whether the brine pump/fan is operating or not.

HP in/out °C
Shows the heat pump's return and primary flow temperatures.

Current L1
Shows the current across the compressor (phase L1).

8.5.3 Operation data heating



This displays the heating system's operational data for the last 24 hours. The furthest point to the right is the present, while the data for the last 24 hours is displayed to the left. The time "rolls" forward.

The blue curve is the current outdoor temperature.

The green and pink curves are room temperatures 1 and 2, respectively.

The red and grey curves are primary flow temperatures 1 and 2, respectively.

The yellow curve is the CTC EcoZenith i250 return temperature.

8.6 Installer

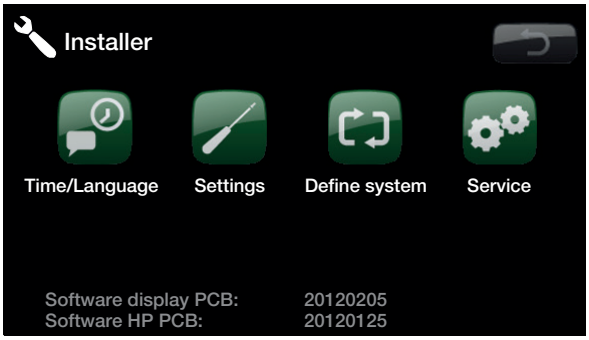
This menu contains four sub-menus: Time/Language, Settings, Define system and Service.

Time/Language includes time and language settings for your CTC EcoZenith i250.

Settings are used both by the installer and users for installing the system.

Define system is used by the installer to define your heating system.

Service is used for troubleshooting and diagnosis. You will find here the options Function test, Alarm history, Factory settings code, Quick start compressor and Software update.



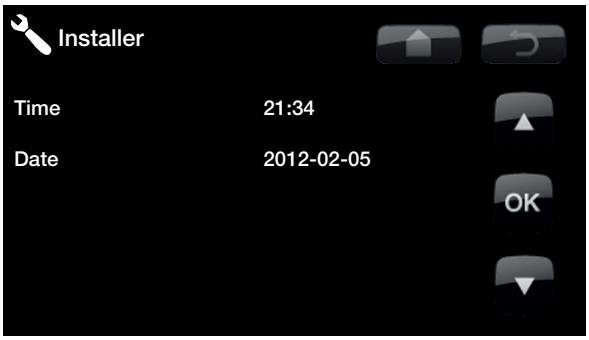
8.6.1 Time/Language

You use this to set the date and time. The clock saves the settings in the event of a power cut. Summer/winter time is changed automatically.

Time settings

When a green box appears around the time, press OK and the first value is selected. Use the arrows to set the correct value.

When you press OK, the next value is highlighted.

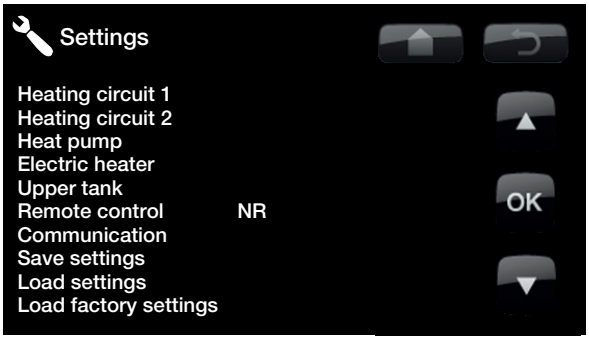


Setting the language

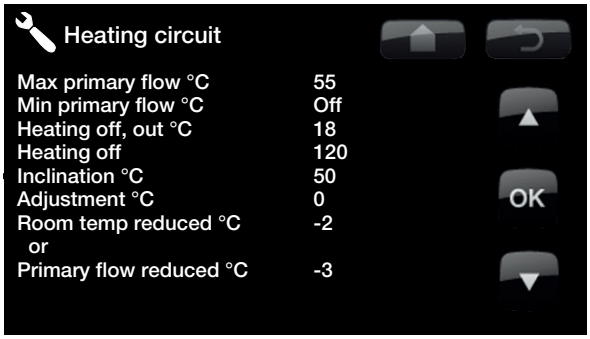
The current language has a green circle around it.

8.7 Settings

This menu is used to set the parameters for your home's heating requirements. It is important that this default setting is adjusted for your property. Values which are set incorrectly may mean that your property is not warm enough or that an unnecessarily large amount of energy is being used to heat your property.



8.7.1 Radiator system 1 or 2



Max. primary flow

The maximum permitted temperature supplied to the radiators. This functions as an “electronic” limiter to protect floor circuits in underfloor heating systems. Radiator system 2 can only give the same temperature as radiator system 1 or a lower temperature.

Min primary flow

You can use this option to set the minimum permitted temperature if you want a specific level of background heating during the summer in the basement or underfloor circuits, e.g. in the bathroom. The heating in other parts of your property should then be switched off using thermostatic radiator valves or shut-off valves. Note that the radiator pump will operate the whole summer. This means that the temperature out to the radiators does not fall below a selected temperature, for example +27°C.
“Off” means that the function is turned off.

Heating off, out

Outdoor temperature limit at which the house no longer requires heating. The radiator pump stops and the mixing valve is kept closed. The radiator pump is activated daily for a short period so that it does not jam. The system restarts automatically when heating is required.

Heating off, minutes

The delay period before the radiator pump stops as described above.

! Tip: Read more about these settings in the chapter on Your property’s heating installation.

For example:
“Inclination 50” means that the temperature of the water supplied to the radiators will be 50°C when the outdoor temperature is -15°C, if the adjustment is set to 0. If the adjustment is set to +5, the temperature will be 55°C instead. The curve is increased by 5°C at all outdoor temperatures, i.e. the curve is parallel offset by 5°C.

Inclination (default setting)

Inclination means the temperature your property needs at different outdoor temperatures. See more detailed information about this in the chapter on Your property's heating installation. The value set is the outgoing flow temperature to radiators when the outdoor temperature is -15 °C. After this default setting, fine adjustment takes place in the "Room temperature" menu.

Adjustment

The adjustment means that the temperature level can be raised or lowered at a specific outdoor temperature. After this default setting, fine adjustment takes place in the "Room temperature" menu.

Room temp. reduced -2 (0 to -40)

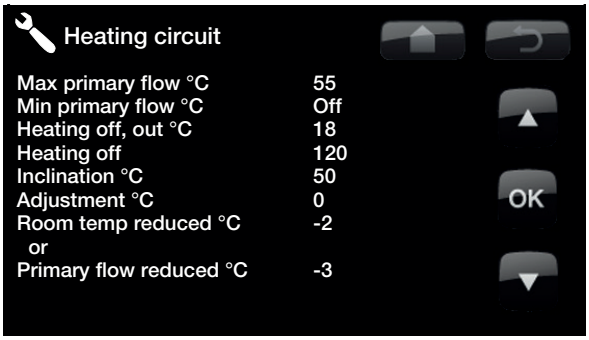
"Room temp. reduced" is displayed if a room sensor is installed.
You define here how many degrees the room temperature will be reduced by during the various scheduled reduction periods, e.g. Night reduction, Holiday, etc.

Example:
Room temp red -2 means that the room temperature is reduced by 2 °C from its normal temperature.

Prim reduced -3 (0 to -40)

If there is no room sensor installed, "Prim reduced" is displayed instead.

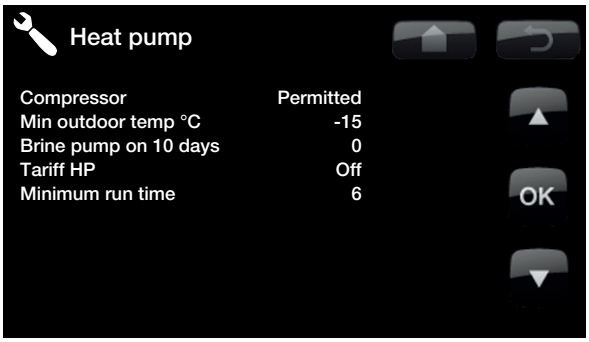
Example:
As a general rule, a Prim reduced value of 3-4 °C is equivalent to a 1 °C reduction in room temperature in a normal system.



Exact primary flow No

Exact primary flow means that the heat pump never switches over and heats the upper tank (hot water charging). This is provided solely by the electric heater. In summer mode however, i.e. if the outdoor temperature is above the limit (Heating off, outside), the heat pump will be allowed to send water to the upper tank.

8.7.2 Heat pump



Compressor

Options: Permitted or Blocked.
The product is supplied with a blocked compressor. When the compressor is blocked, the product operates like an electric boiler. All other functions are intact. Permitted means that the compressor is allowed to operate.

Min. outdoor temp. °C -15 (-22 to 0)

This menu is displayed only if the heat pump is an EcoAir model, and includes settings for the outdoor temperature at which the compressor is no longer permitted to operate. The heat pump starts 2°C above the set value. The lowest outdoor temperature required for start is -18°C.

Brine pump on 10 days

Options 0 or 10 days.
After installation is complete, you can choose to run the brine pump constantly for 10 days to remove air from the system.

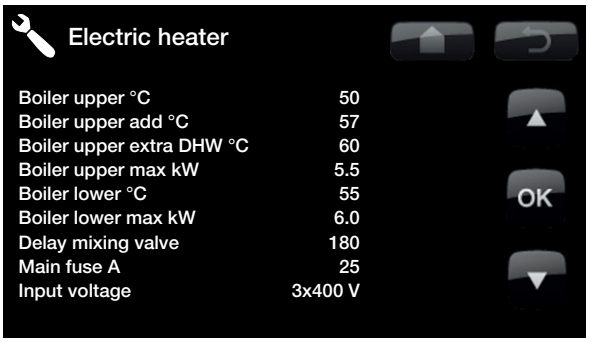
Tariff HP

This is used when a dual tariff is used with lower energy costs at set hours of the day. The heat pump can then take advantage of reduced primary energy costs. It must be set to Off.

Min oper. time 6 (0 to 20)

Minimum operating time in minutes that the compressor is permitted to operate. Even if the tank's stop temperature has been achieved, the compressor continues to supply energy during this period.

8.7.3 Immersion heater


Electric heater
Boiler upper °C 50
Boiler upper add °C 57
Boiler upper extra DHW °C 60
Boiler upper max kW 5.5
Boiler lower °C 55
Boiler lower max kW 6.0
Delay mixing valve 180
Main fuse A 25
Input voltage 3x400 V
OK

Upper boiler °C **50 (30 to 60)**

Temperature when the immersion heater kicks in and helps EcoZenith i250 to produce domestic hot water when there is great demand. A low setting is recommended.
The immersion heater is also responsible for providing the house with additional heating. If the house requires a higher temperature than that selected, the control system compensates by automatically raising the temperature of the immersion heaters.

This temperature also reflects the settings chosen under DHW.

Upper boiler add heat °C **57 (30 to 70)**

The temperature of the boiler when EcoZenith i250 calls for assistance to reach the high temperature; the immersion heater then works up to this value after the set time delay on the mixing valve.

Upper boiler extra DHW **60 (30 to 70)**

This means the boiler is to provide extra DHW. This setting determines whether the electric heater should help to produce extra hot water. Set the temperature of the electric unit to the desired value when the option for extra hot water is activated under the DHW menu. A lower value means that the heat pump produces the majority of hot water, not the immersion heater.

Upper boiler max. kW **5.5 (0 to 9.0)**

You set the max. permitted power for the immersion heater here.
Setting for the maximum permitted power for the electric unit. 0 to 9.0 kW in steps of 0.3 kW.

Lower boiler °C **55 (30 to 70)**

Setting for the temperature of the lower immersion heater.

Lower boiler kW **6 (0/6.0)**

Setting for the power of the lower immersion heater, 0 and 6 kW respectively. An additional 3 kW is possible. Contact CTC for more information.

Delay mixing valve 180 (30 to 240, blocked)

The mixing valve delay, the period before it draws energy from the immersion heater, is set here. It can be set from 30 to 240 minutes. If the value is set higher than 240 mins, the mixing valve is completely blocked from taking heat from the boiler.

Main fuse A **20.0 (10.0...35.0)**

The property's main fuse size is set here. This setting and the fitted current sensors ensure the fuses are protected when using appliances which generate temporary power peaks, for example, cookers, ovens, engine heaters, etc. The product temporarily reduces power drawn where this type of equipment is being used.

Input voltage **3x400 V**

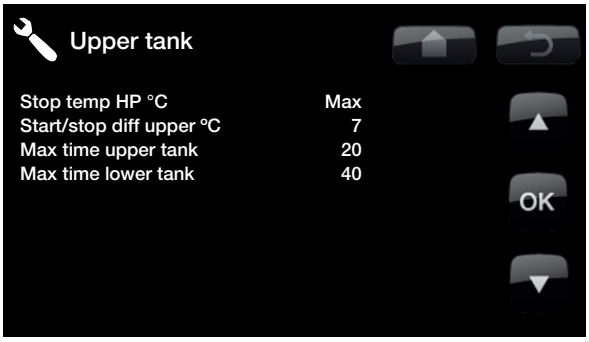
The value is set here to indicate whether the CTC EcoZenith is connected at 3x400 V, 1x230 V or 3x230 V. 3x400 V and 1x230 V are valid for the UK.

Tariff, EL **Off**

This is used when a dual tariff is used with lower energy costs at set hours of the day. The heat pump can then take advantage of reduced primary energy costs. It must be set to Off.

8.7.4 Upper tank

(Only applies to installed heat pumps.)



Stop temp HP °C **Max. (40 to 58, Max.)**

At this temperature, the heat pump stops charging the upper tank.

Start/stop diff upper °C **7 (3 to 10)**

Hysteresis before the heat pump starts or stops charging the upper tank.

Max. time upper tank, mins **20 (10 to 150)**

This is the maximum time spent by the heat pump charging the upper tank if it is needed in the lower tank.

Max.time lower tank, mins **40 (10 to 120)**

This is the maximum time spent by the heat pump charging the lower tank if it is needed in the upper tank.

8.7.5 Remote control

Shows the type of remote control selected.
"NR" = Remote night reduction, e.g. via the minicall system. SO = Ripple control. Disconnecting the compressor and immersion heater during a certain period which is defined by the electrical supplier (special equipment).
DHW = Extra hot water, used along with the Extra DHW button.

8.7.6 Communication

These settings are activated for the Superior systems and are not used in normal operation. They are not described in these instructions.

8.7.7 Solar panels (accessories)

These settings are for accessory solar panels and these are described in the chapter **Settings menus for solar panels**

8.7.8 Diff thermostat function

The function must be defined before the settings can be entered. The operating thermostat function is used if you want to charge your system tank (e.g. EZ 250) from a water-jacketed stove, or another water source.

However, this function cannot be combined with the same function in a solar heating system (when e.g. an EcoTank is connected to an EZ 250). This is because the same outlets and sensors are used for both functions.

Information about the operating thermostat function will be displayed under Operation data.

Charge start diff temp, °C **7 (3...30)**

Here you can set the temperature difference determining when charging from external energy source is started. The energy source must be this many degrees warmer than the tank temperature for charging to start.

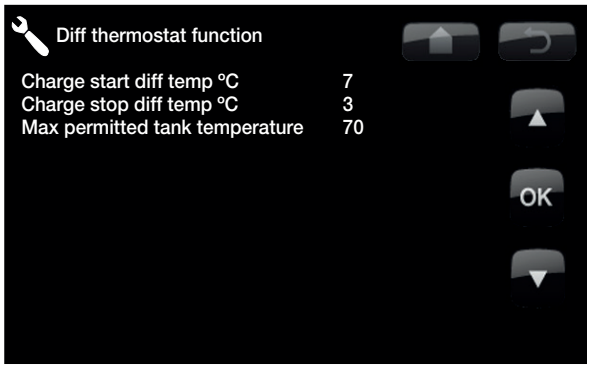
Charge stop diff temp, °C **3 (2...20)**

Here you can set the temperature difference determining when transfer is stopped. When the temperature difference between the energy source and the tank falls below this set value, the charging stops.

Max permitted tank temp, °C **70 (10...80)**

Setting the maximum permitted temperature in the main tank (EcoZenith/EcoHeat). Transfer ceases once the set temperature has been reached

! NOTE! If the expansion card has not been installed and solar panels are defined, the product will emit an alarm:
Comm. fault expansion card.



8.7.9 Save settings

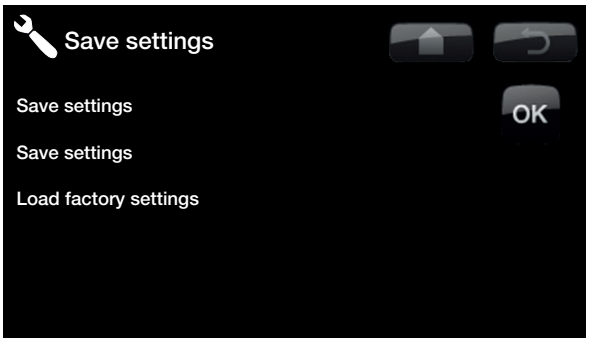
Save settings. You can set your own parameters here. Press OK to confirm.

8.7.10 Load settings

Load settings The saved settings can be reloaded using this option.

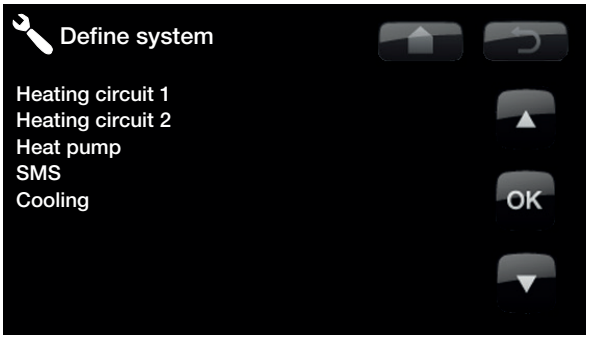
8.7.11 Load factory settings

Load factory setting The product is supplied with the factory values set. They can be restored by activating this function. Press OK to confirm. However, the product and product size are retained.



8.8 Define system

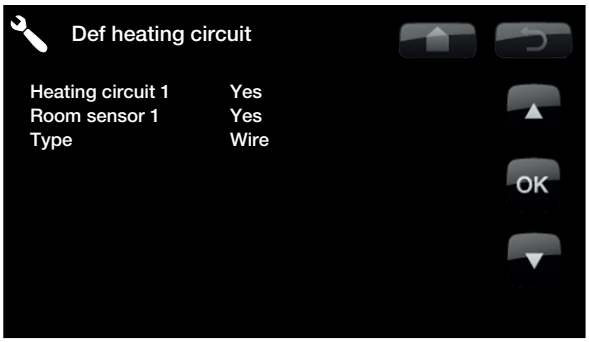
You can use this option to define your heating system, how the radiator systems are controlled, with or without a room sensor. CTC EcoZenith's flow switch, GSM and Cooling are also defined here. Definition takes place in conjunction with installation.



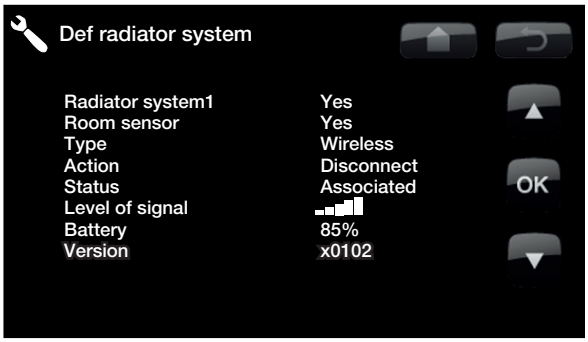
8.8.1 Def radiator system 1 or 2

Specify whether the room sensor should be connected to the system. No/Yes

Select whether the room sensor for the heating system is permanently connected or wireless. Wired/Wireless



If a wireless room sensor has been installed, scroll down to "Type: Wireless" and press "OK". The cursor moves to the word "Association". Press "OK" again. The system now waits for the room sensor to communicate with the heat pump.
See the manual for the wireless room sensor for more information.

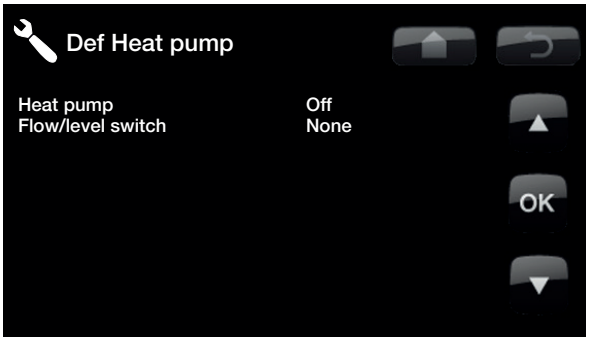


8.8.2 Def Heat pump

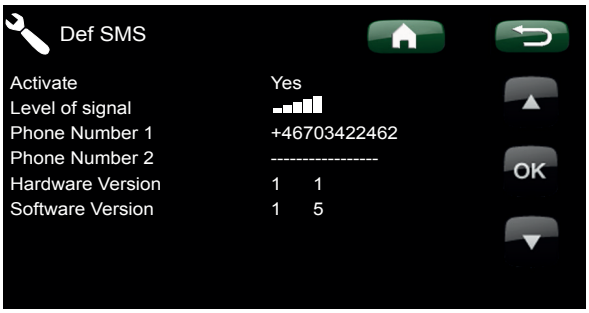
Heat pump **On/Off**
Specify here whether the heat pump is installed.

Flow/level switch
(Only applies to EcoPart.) Specify whether or which type of level switch is installed in the system (accessory). Choose between:

- None
- NC (Normally Closed)
- NO (Normally Open).



8.8.3 Def. SMS



This is for defining whether SMS control is installed (accessory).

Activate **Yes (Yes/No)**
If “Yes”, the menus below will be displayed.

Level of signal
The level of signal of the reception is shown here.

Phone Number 1
The first activated phone number is shown here.

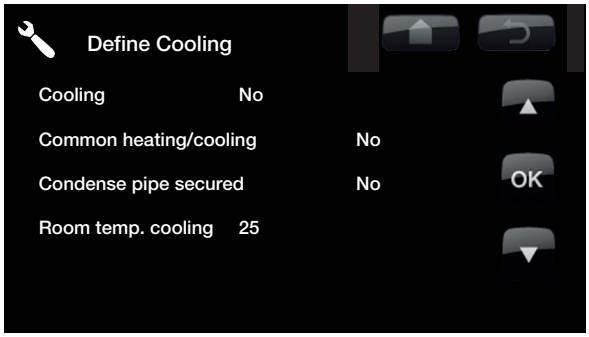
Phone Number 2
The second activated phone number is shown here.

Hardware Version
The hardware version of the SMS equipment is shown here.

Software version
The software version of the SMS equipment is shown here.

NB: For more information on the SMS function, see the “CTC SMS” manual.

8.8.4 Def cooling



(Only applies to EcoPart.)

Cooling **No (No/Yes)**
This is for selecting whether cooling is installed (accessory).

Common heating/cooling **No (No/Yes)**
The cooling system is common to both heating and cooling. In the event the answer is “NO”, heating is run on circuit 1 and cooling on circuit 2. In the event the answer is “YES” (common), circuit 1 is used for both heating and cooling.

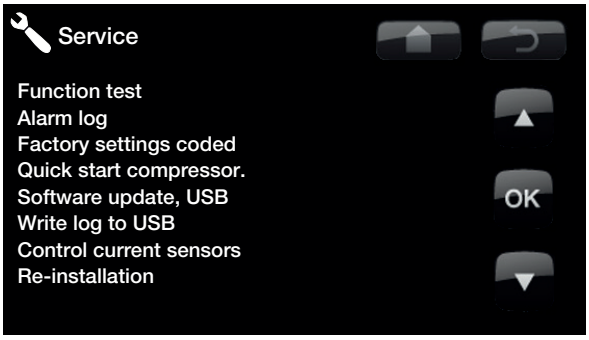
Condense pipe secured **No (No/Yes)**
If a condense pipe for the system has been secured, significantly lower temperatures are permitted at various points in the system. WARNING Build-up of condensation in the house structure can lead to damp and damage from mildew. In the event of doubt, contact an expert surveyor for an assessment.

Room temperature cooling **25 (10 to 30)**
This is used to set the desired room temperature for cooling.

NOTE: See CTC EcoComfort manual for more information.

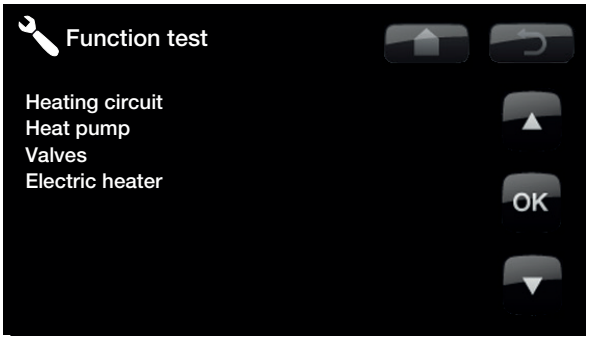
8.8.5 Service

NB: This menu is only for the installer to use.



Function test

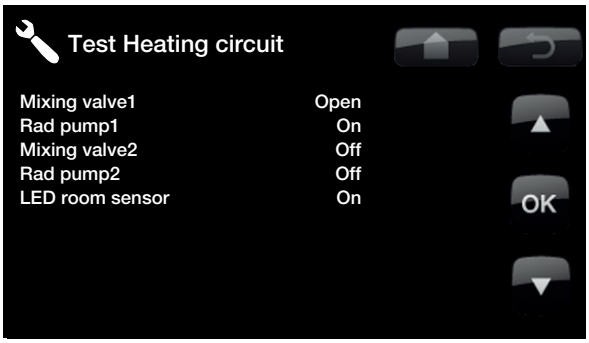
This menu is intended to test the function of the various components in the product. When the menu is activated, all the product's functions stop. Each component can then be tested separately or together. All control functions are shut off. The only protection against incorrect operation are pressure sensors and the immersion heater's superheat protection. When you exit the menu, EcoZenith returns to normal operation. If no button is pressed for 10 minutes, the product automatically returns to normal operation.
The exception is if only the brine pump is started. It can be operated for long periods of time. It is used together with the external filling pump during installation.



When you exit the menu, CTC EcoZenith returns to the start menu.

Test radiator system

If two radiator systems are installed, the values for both are displayed here.



Mixing valve

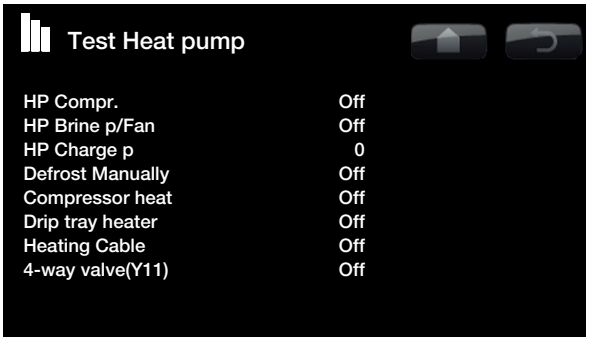
Opens and closes the mixing valve. Open/Close

Rad pump

Starts and stops the radiator pump. On/Off

LED room sensor

The room sensor alarm function can be controlled from here. When activated, the room sensor's red LED comes on steady.



Test Heat pump

Function test carried out on the heat pump.

HP Compr.

Compressor On/Off. This is where the function test is carried out on the compressor. The fan or brine pump and charge pump are also operating so that the compressor is not going to trigger its pressure switches.

HP Brine pump/Fan.

Brine pump On/Off. Activation of the fan or brine pump.
EcoAir: the fan can be adjusted 0-100%

HP Charge pump

Charge pump On/Off. Function test 0-100%.

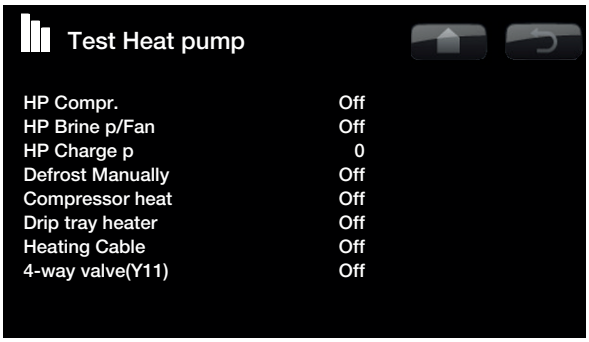
Manual defrosting (Only applies to CTC EcoAir)
Manual defrosting function test On/Off

Compressor heater (Only applies to CTC EcoAir)
Compressor heater function test On/Off .

Heater condensation tray (Only applies to CTC EcoAir)
Heater condensation tray function test On/Off .

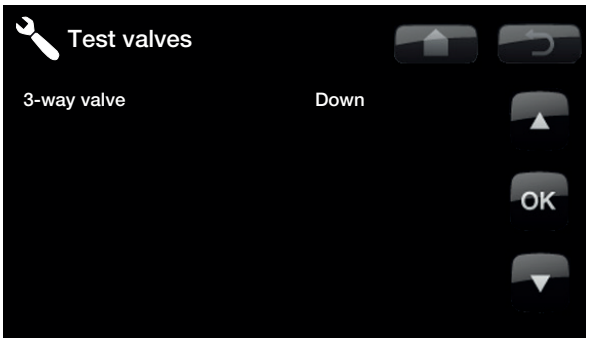
Heating cable (Only applies to CTC EcoAir)
Heating cable function test. (Accessory) On/Off

4-way valve (Only applies to CTC EcoAir)
4-way valve function test On/Off .



Valves

Function test carried out on the flow conditioner. This involves testing the flow Up or Down (upper and lower parts of the tank respectively).



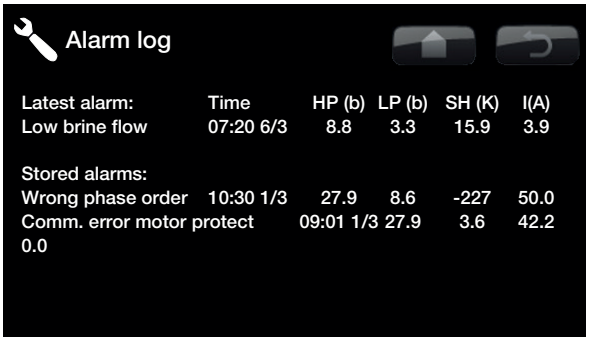
Immersion heater

You use this function to test the immersion heater's phases: L1, L2 and L3.
The modes available are On/Off

Alarm log

You can use this to read information about the latest alarms. The latest alarm is displayed at the top and the four latest alarms are shown under Stored alarms.

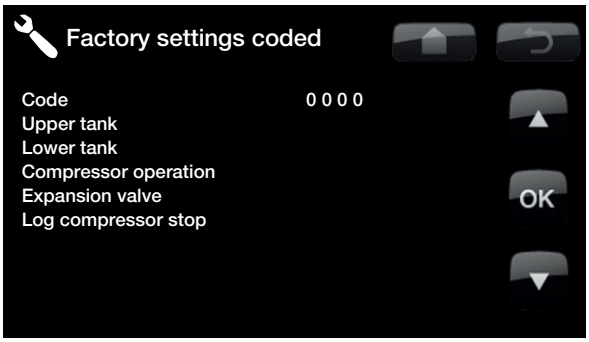
An alarm which reoccurs within an hour is ignored so as not to fill up the log. If all the alarms are the same, this can indicate that there is an intermittent fault, e.g. a loose contact.


Alarm log
Latest alarm: Time HP (b) LP (b) SH (K) I(A)
Low brine flow 07:20 6/3 8.8 3.3 15.9 3.9
Stored alarms:
Wrong phase order 10:30 1/3 27.9 8.6 -227 50.0
Comm. error motor protect 09:01 1/3 27.9 3.6 42.2
0.0

Factory settings coded

NB: Only an authorised service engineer is allowed to log in to the Factory settings coded option. Severe operational problems and faults may occur affecting the product if values are amended without authorisation. Note that in such cases the warranty terms do not apply.

This menu is intended to set the manufacturer's operational and alarm limits. A 4-digit code must be specified to be able to amend these limits. However, you can also take a look without any code to see what options feature in the menu.



Quick start compressor

(Applies only if heat pump is installed.)

When starting up the product, the compressor's start is delayed by 10 minutes. This function speeds up this process.

Software update, USB

This is only for service engineers. This option can be used to update the software in the display via USB. The software update process is complete when the start menu appears.

Write log to USB

This is only for service engineers. This function can be used to save logged values to a USB memory stick.

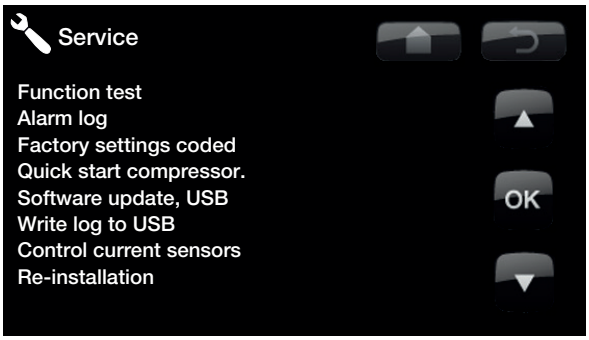
Control current sensors

This is for identifying which current sensor is connected to the relevant phase.
All three currents (L1, L2 and L3) will appear in the current operational data when EcoZenith i250 has identified the current transformers' relevant phases.

When activating the function "Control current sensors" it is important that you have switched off any major consumers of electricity in the house. Also make sure that the backup thermostat in CTC EcoZenith i250 is turned off.

Re-installation

This command re-launches the installation sequence. See the chapter on First start.



NB: The power to the product must not be interrupted, under any circumstances, during the update process.

NB: Turn off the power and always restart the product after the program update! Several minutes may pass before the display communicates clearly after restart.

9. Operation and Maintenance

When the installer has installed your new system, you should check along with the installer that it is in perfect operating condition. Let the installer show you where the switches, controls and fuses are so that you know how the system works and how it should be maintained. Bleed the radiators after around three days of operation and top up with water if required.

Boiler and radiator system safety valve

Check around four times a year that the valve is working by manually turning the control. Check that water is coming out of the safety valve discharge.

Mixing Valve

The mixing valve is operated automatically from the control system, ensuring that the radiators reach the correct temperature, no matter what season it is. However, where a fault occurs, you can operate the valve by pulling out the knob on the motor and turning it clockwise to reduce the temperature or anticlockwise to increase it.

! Do not forget to re-set the mixing valve to automatic mode. Push the knob back

Draining the tank

The CTC EcoZenith should be disconnected from the power source when it is being drained. The drain valve is positioned at the bottom left of the unit when viewed from the front, behind the front of EcoZenith. When draining the whole system, the mixing valve should be fully open, i.e. turned anticlockwise as far as it will go. Air must be supplied to the closed system.

Shut-down

The CTC EcoZenith i250 is shut down using the operating switch. If there is a risk of the water freezing, all the water should be drained from the heat pump and the radiator system (see drainage above).

The DHW circuit, which contains around five litres, must also be emptied. Disconnect the cold water connection to CTC EcoZenith i250. Feed a hose into the cold water connection to CTC EcoZenith i250. The hose must go down to the bottom of the coil for all the water to be drained. Draining is carried out by siphoning out the water.

10. Troubleshooting/measures

The CTC EcoZenith i250 is designed to provide reliable operation and high levels of comfort, and to have a long service life. Various tips are given below which may be helpful and guide you in the event of an operational malfunction.
If a fault occurs, you should always contact the installer who installed your unit. If the installer believes the malfunction is due to a materials or design fault, then they will contact us to check and rectify the issue. Always provide the product's serial number.

DHW

Many people want to gain maximum benefit from the CTC EcoZenith i250's low operating costs.
The control system is equipped with three comfort levels for hot water. We recommend starting at the lowest level and if there is not enough hot water, increase it to the next level. We also recommend that you operate a regular hot water pattern.
Check that the hot water temperature is not being affected by a poor mixing valve, whether in the CTC EcoZenith i250 or possibly the shower mixer.

! Avoid running hot water at the highest flow capacity. If you run a bath at a rather slower rate instead, you will get a higher temperature.

The Heating System

A room sensor, which should be fitted when possible, ensures that the temperature in the room is always suitable and stable. For the sensor to provide the correct signals to the control unit, radiator thermostats should always be fully open in the area where the room sensor is located.
A correctly operating heating system is of significant importance to the heat pump's operation and affects energy savings.
When adjusting the system, always do so with all radiator thermostats fully open. The thermostats can be individually adjusted after a few days in the other rooms.

! Avoid placing the room sensor close to the stairway due to the uneven air circulation.

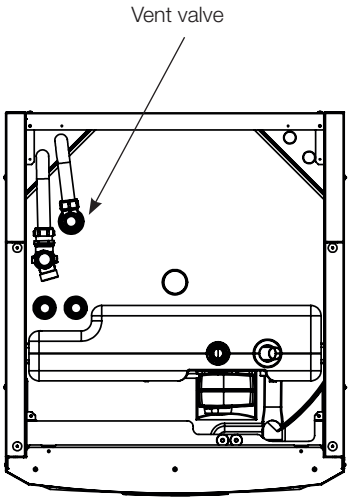
! If you do not have radiator thermostats on the upper floor, you may need to install them.

If you do not achieve the set room temperature, check:

- that the radiator system is correctly adjusted and is functioning normally. that radiator thermostats are open and the radiators are equally warm all over. Touch the entire radiator surface. Bleed the radiators. The CTC EcoZenith i250's economical operation requires that the radiator system functions well, if you are to make good savings.
- that EcoZenith is operating and no error messages are displayed.
- that there is sufficient electrical power available. Increase if necessary. Also check that the electric power output is not limited due to excessively high electricity loads in the property (load monitor).
- that the product is not set to the “Max. allowed primary flow temperature” mode with a too low set value.
- that “Primary flow temperature at –15°C outdoor temperature” is set sufficiently high. Increase if necessary. More can be read about this in the chapter on The house heating curve. However, always check the other points first.
- that the temperature set back is not maladjusted. See Settings/Radiator system.
- that the mixing valve is not in the manual position.

If the heat is not even, check:

- that the placement of the room sensors is appropriate for the house.
- that the radiator thermostats don't interfere with the room sensor.
- that no other heat sources/cold sources interfere with the room sensor.
- that the mixing valve is not in the manual position.



! Don’t forget that the radiators may also need bleeding.

Current Monitor

The CTC EcoZenith i250 has an integrated current monitor. If the system is fitted with a current sensor, the property's main fuses are continuously monitored to ensure they are not overloaded. If this should happen, electric stages are disconnected from the CTC EcoZenith.
The CTC EcoZenith i250 may be restricted where high heating requirement levels are combined with, for example, single-phase motor heaters, cookers, washing machines or tumble dryers. This may result in inadequate heating or hot water temperatures. If the CTC EcoZenith is restricted, "High current, elpower redu (X A)" appears in text form in the display. Consult an electrician to determine whether the fuse size is correct or the three phases in the house are evenly loaded.

Air problems

If you hear a rasping sound from the tank, check that it has been properly bled. Turn the boiler vent valve so that any air can be evacuated. Top up with water where required, so that the correct pressure is achieved. If this noise recurs, call a technician to check the cause.

Unusual noise when shutting off DHW

In some cases, unusual noises may be produced by the house's pipe system and the CTC EcoZenith i250 due to the jolts which occur when the flow is quickly interrupted. There is no fault with the product, but the noise may occur when older model outlets are used. More recent outlets are often fitted with a soft-closing mechanism. If an unusual sound comes from hard-closing dishwasher and washing machines, this can be remedied using a shock arrestor. A shock arrestor can also be an alternative to soft-closing water taps.

Motor protection (when heat pump is connected)

The CTC EcoZenith i250 constantly monitors the compressor's operating current and an alarm is triggered if the compressor is using an unusually high current. When a fault occurs the message "Motor protect high current" is displayed.

The cause of the fault may be as follows:

- Phase failure or mains interruption. Check the fuses, which are the most common cause.
- Compressor overload. Call out a service engineer.
- Faulty compressor. Call out a service engineer.
- Circulation too poor between the cooling circuit and cylinder. Check the heat medium pump (left pump, viewed from front).
- Abnormally high temperature in the brine circuit. Call out a service engineer.

10.1 Information messages

Information messages are displayed when appropriate and are intended to inform users about various operational situations.

Start delay
The compressor is not allowed to start too quickly when it has stopped. The delay is usually approx. 10 minutes.

Heating off, radiator sys
Shows that the product is operating in summer-time mode when only hot water is required, not heating.

Ripple control
Shows that ripple control is active. Ripple control is a device which an electricity provider can fit with the aim of disconnecting high current draw equipment requiring power for a short period of time. Not currently in use in the UK. The compressor and electrical power are blocked when ripple control is active.

High current, reduced electricity (xA)
The property's main fuses are overloaded due to the fact, for instance, that several appliances requiring power are being used simultaneously. The product reduces the electric heaters' electrical output over time.

Tariff, HP off.

This is used when a dual tariff is used with lower energy costs at set hours of the day. The heat pump can then take advantage of reduced primary energy costs.

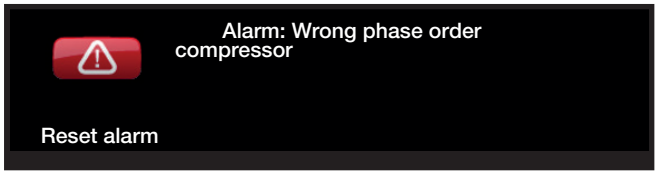
Tariff, EL, off.

This is used when a dual tariff is used with lower energy costs at set hours of the day. The heat pump can then take advantage of reduced primary energy costs.

Compressor blocked

The compressor is set to be shut down, e.g. before drilling or digging has been carried out for the collector loops. The product comes with the compressor shut off. This option is selected under the Installer/Settings/Heat pump menu.

10.2 Alarm messages



If a fault occurs with a sensor, for instance, an alarm is triggered. A message appears on the display informing about the fault.

You reset the alarm by pressing the Reset alarm button on the display.
If several alarms are triggered, they are displayed one after the other. An outstanding fault cannot be reset without being rectified first. Some alarms are reset automatically if the fault disappears.

The description below also includes an alarm for connected heat pump.

Alarm text	Description
Wrong phase order compressor	The product's compressor motor must rotate in the right direction. The product checks that the phases are connected correctly; otherwise, an alarm is triggered. In this case, two of the phases to the product need to be changed. The power supply to the system must be shut off when rectifying this fault. This fault generally only occurs during installation.
Alarm sensor	An alarm is displayed if a fault occurs with a sensor that is not connected or has short-circuited and if the value is outside the sensor's range. If this sensor is significant to the system's operation, the compressor stops. In this case, the alarm is reset manually after the fault has been rectified. For these sensors the alarm is reset automatically after correction: Sensor upper tank (B5), Sensor lower tank (B6), Sensor prim flow 1 (B1), Sensor prim flow 2 (B2), Sensor out (B15), Room sensor 1 (B11), Room sensor 2 (B12), Sensor brine out, Sensor brine in, Sensor HPin, Sensor HPout, Sensor discharge, Sensor suction gas, Sensor high pressure, Sensor low pressure.
Motor protect compressor	High/low current has been detected to the compressor. Press reset and check whether the alarm recurs. If the fault recurs, contact your installer.
High pressure switch	The refrigerant's high pressure switch has been triggered. Press reset and check whether the alarm recurs. If the fault recurs, contact your installer.
Low brine temp	Incoming brine temperatures from borehole/ground loop are too low. Press reset and check whether the alarm recurs. If the fault recurs, contact your installer to check the dimensions of the cold side.
High brine temp	Incoming brine temperatures from borehole/ground circuits are too high. Press reset and check whether the alarm recurs. If the fault recurs, contact your installer to check the heat source. Excessively high brine circuit temperatures over a long period can damage the compressor.
Low brine flow	Low brine flow is very often due to air in the collector system, particularly just after installation. Collectors which are too long can also be a cause. Check also that the brine pump is set to speed 3. Press reset and check whether the alarm recurs. Also check the brine filter that has been installed. If the fault recurs, contact your installer.

Alarm text	Description
4-way valve alarm	This alarm is displayed if a fault occurs with EcoAir's 4-way valve or if the pipes to EcoAir are incorrectly connected. Press reset and check whether the alarm recurs. If the alarm recurs, check that the charge pump is pumping water to the heat pump's lower connection. If the fault recurs, contact your installer.
Max. thermostat	If the heat pump has been stored in an extremely cold place, the max. thermostat may have been triggered. You reset it by pressing in the button on the electrical switchboard behind the front panel. Always check on installation that the max. thermostat has not tripped.
Communication error PCB, Communication error HP, Communication error motor protect	This message is displayed when the display card cannot communicate with the relay card. This message is displayed when the display card cannot communicate with the HP control card. This message is displayed when the HP control card cannot communicate with the motor protection.
Fuses	This message appears when fuse F1 has been triggered.
High compr. temp	This message appears when the compressor temperature is high. Press reset and check whether the alarm recurs. If the fault recurs, contact your installer.
Low evaporation	This message appears when the evaporation temperature is low. Press reset and check whether the alarm recurs. If the fault recurs, contact your installer.
High evaporation	This message appears when the evaporation temperature is high. Press reset and check whether the alarm recurs. If the fault recurs, contact your installer.
Low suct gas exp. valve	This message appears when the suction gas temperature is low. Press reset and check whether the alarm recurs. If the fault recurs, contact your installer.
Low evapor exp. valve	This message appears when the expansion valve’s evaporation temperature is low. Press reset and check whether the alarm recurs. If the fault recurs, contact your installer.
High evapor exp. valve	This message appears when the expansion valve’s evaporation temperature is high. Press reset and check whether the alarm recurs. If the fault recurs, contact your installer.
Low superheat exp. valve	This message appears when the expansion valve’s superheat temperature is low. Press reset and check whether the alarm recurs. If the fault recurs, contact your installer.
EVO off	This message appears when there is a fault with the expansion valve control. Contact your installer.
Phase missing	This message appears in the event of a phase failure. Call in a specialist to check the cause.
Compressor type?	This message appears if there is no information about the compressor type.
Heat pump alarm	This message appears if the heat pump is in alarm mode.

11. Installation

This chapter is aimed at anyone responsible for one or more of the installations required to ensure that the product works the way the property owner wants.

Take your time going through functions and settings with the property owner and answer any questions. Both you and the CTC EcoZenith i250 benefit from a user who has completely understood how the system operates and should be maintained.

> ! The product must be transported and stored in an upright position.

11.1 Transportation

Transport the unit to the installation site before removing the packaging. Handle the product in the following manner:

- Forklift
- Lifting eye that has been fitted to the lifting sleeve on top of the EcoZenith i250. An extra sleeve can be found in the middle, under the insulation.
- Lifting band around the pallet. **NB:** Can only be used with the packaging on.

Remember that the CTC EcoZenith i250 has a high centre of gravity and should be handled with caution.

11.2 Unpacking

Unpack the CTC EcoZenith i250 when it is placed next to its installation site. Check that the product has not been damaged in transit. Report any transport damage to the carrier. Also check that the delivery is complete according to the list below.

Standard delivery

- CTC EcoZenith i250 system tank with factory-installed charge pump for connection of heat pump.
- Kit bag containing:
  - room sensor
  - primary flow sensor
  - return sensor
  - outdoor sensor
  - installation and maintenance manual
  - safety valve for drinking water, 9 bar
  - safety valve for cold side, 3 bar
  - 2 x cable ties
  - 3 x current sensors

12. Pipe installation

The installation must be carried out in accordance with current standards and regulations. The product must be connected to an expansion vessel in an open or closed system.

Do not forget to flush the radiator system clean before connection.

Apply all the installation settings based on the description in the chapter on “First start”.

12.1 Filling

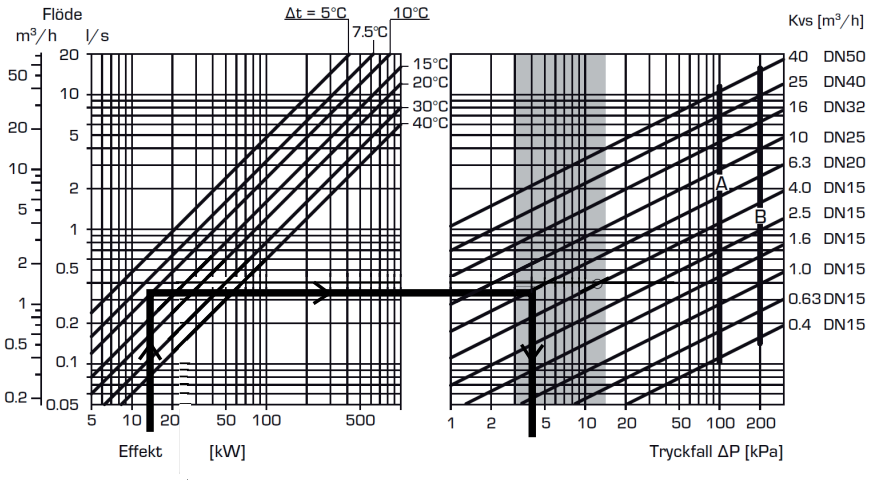
Filling valve (no. 90, see schematic diagram on next page) is connected to the radiator return pipe. Alternatively, the valve can be installed in the direction of the expansion pipe. When filling the system, the mixing valve (Y1) must be wide open. Pull out the knob on the valve and turn it anticlockwise as far as you can. Do not forget to push in the valve’s knob in automated mode.

12.2.1 Pressure drop in mixing valve

The diagram below shows a drop in pressure in the mixing valve.

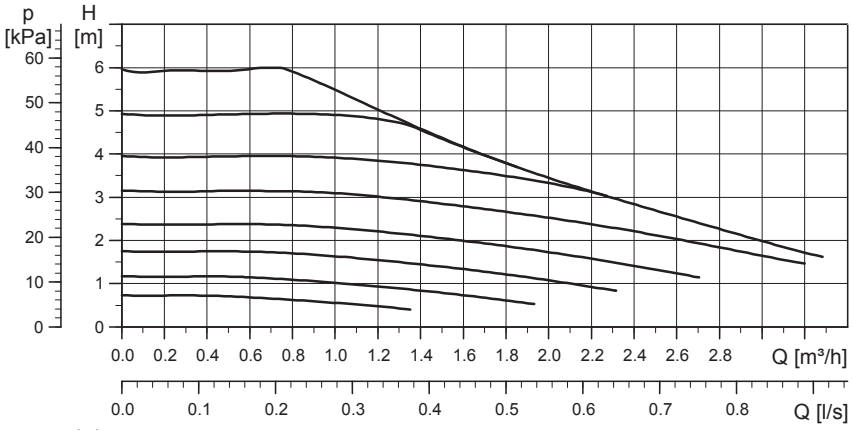
Start with the heat requirement in kW (e.g. 15 kW), then move vertically to the selected Δt (e.g. 10°C). Then move horizontally to the line for the EcoZenith i250 mixing valve = line 6.3 DN20. The reading for the pressure drop is taken from the scale directly below (4 kPa).

For EcoZenith i250, see valve DN20.



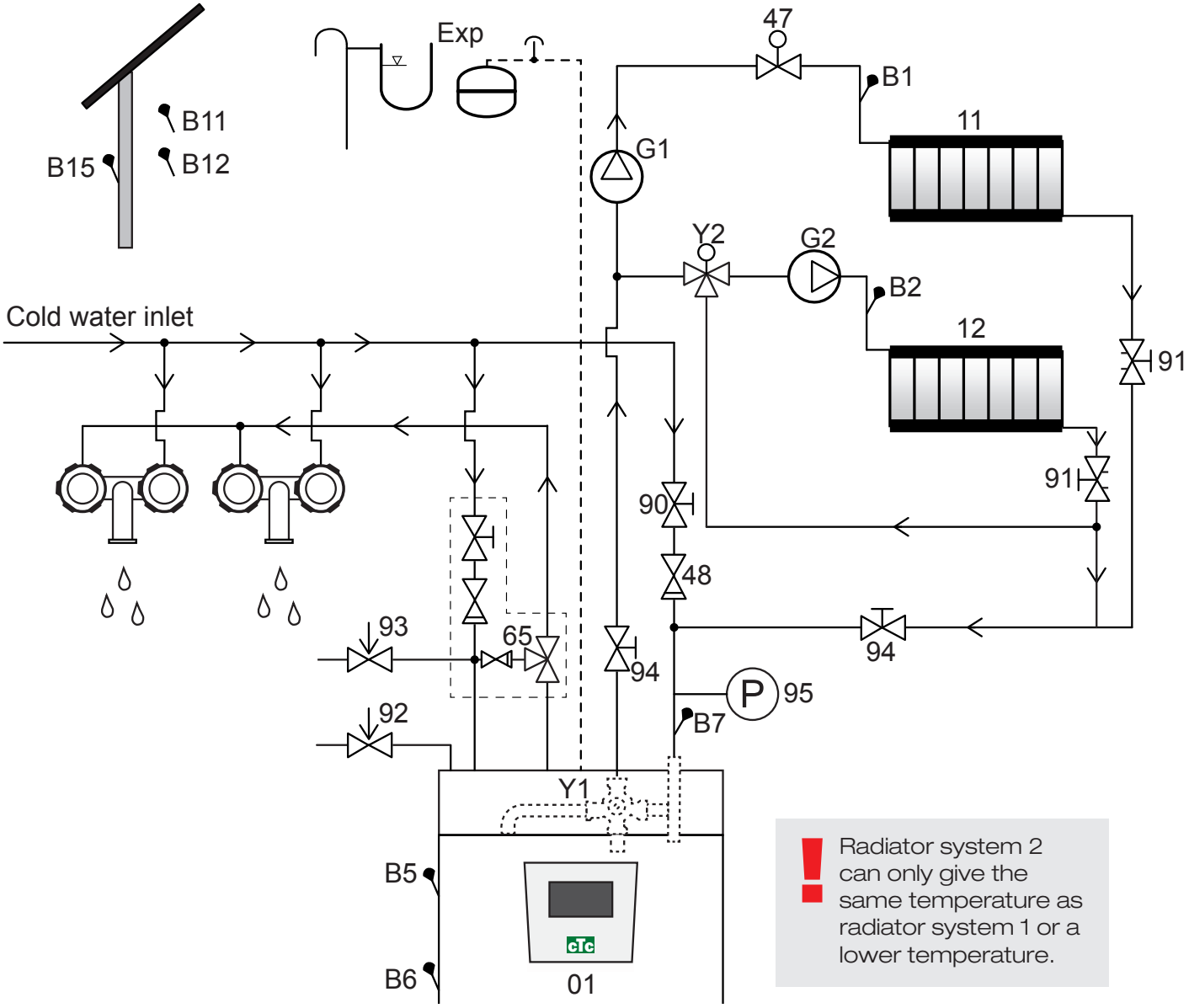
12.2.2 Pump curve charge pump

The diagram below shows the pump curve for the factory-installed charge pump for a Grundfos UPM2 15-60 130 heat pump.



12.2 Schematic diagram

This shows the main connection between the CTC EcoZenith i250 and the property's radiator and hot water system. Different installations and systems may look different, such as a one- or two-pipe system, which means that the finished installation may be different.



01	CTC EcoZenith i250	Y2	Mixing valve, radiator system 2
B1	Primary flow sensor for radiator system 1	11	Radiator system 1
B2	Primary flow sensor for radiator system 2	12	Radiator system 2
B5	Sensor upper tank	47	Electric shut-off valve for radiator system
B6	Sensor lower tank	48	Non-return valve for incoming cold water
B7	Sensor, radiator return	65	Mixing valve for DHW
B11	Room sensor 1	90	Filling valve, radiator system
B12	Room sensor 2	91	Adjustment valves for radiator coils
B15	Outdoor sensor	92	Boiler safety valve (factory-installed), 2.5 bar
G1	Circulation pump, radiator system 1	93	Safety valve for DHW
G2	Circulation pump, radiator system 2	94	Shut-off valve
Y1	Mixing valve, bivalent radiator system	95	System/boiler pressure installed on return pipe

Circulation pump, radiator system (G1) (G2)

The circulation pump is fitted on the boiler's primary flow and must be connected electrically from the boiler, see chapter on Electrical installation.

Mixing valve DHW (65)

Install a mixing valve for the hot tap water in order to avoid the risk of scalding.

Safety valve DHW (93)

Fit the enclosed valve to the incoming cold water connection. Connect the waste pipe to the waste system directly to the floor gully or, if the distance is more than two metres, to a funnel. The waste pipe must slope towards the waste system, be installed frost-free and left open to the atmosphere/without pressure.

Non-return valve (48)

Fit the non-return valve to the incoming cold water connection.

Shut-off valve (94)

It is important to fit a shut-off valve (94) to both the primary and return flows.

Boiler safety valve (92)

The boiler's safety valve (2.5 bar) is fitted in the factory on the left side of the top. Connect the waste pipe to the waste system directly to the floor gully or, if the distance is more than two metres, to a funnel. The waste pipe must slope towards the waste system, be installed frost-free and left open to the atmosphere/without pressure.

Filling valve for radiator system (90)

Fit a filling valve between the cold water connection and the radiator return pipe, or between the cold water pipe and the expansion pipe. Observe the building regulations of the Swedish National Board of Housing, Building and Planning (Boverket) and the standard SS-EN 1717.

Manometer system pressure (95)

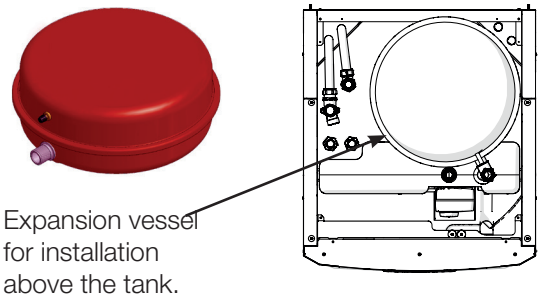
Fit the manometer on the expansion pipe or radiator return pipe.

! NB: It is important to fit a shut-off valve (94) to both the primary and return flows.

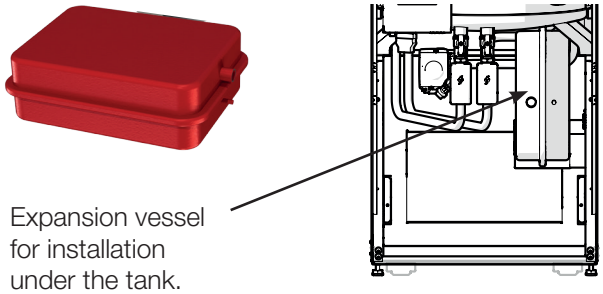
! NB: The waste pipe must be fitted to the waste system.

Expansion vessel connection

The CTC EcoZenith i250 is best connected to a closed expansion vessel. The CTC EcoZenith i250 is designed to be fitted to an 18 l closed expansion vessel. The expansion vessel is either fitted in the area under the tank or on top of the product (see pictures). The expansion vessel with installation kit is available as an accessory.



Expansion vessel for installation above the tank.



Expansion vessel for installation under the tank.

NB: If the heat pump is not connected, the connections not being used must be capped off!

If you use an open system, the distance between the expansion vessel and the highest placed radiator must not exceed 2.5 m in order to avoid introducing oxygen into the system.

Note that no hot water circulation may be connected as it affects the function of the EcoZenith and the system. If the EcoZenith i250 is connected to another heat source, e.g. an existing boiler, the installations must have separate expansion vessels.

Water taps

In some cases, unusual noises may be produced by the house's pipe system and the EcoZenith i250 due to the jolts which occur when the flow is quickly interrupted. There is no fault with the product, but the noise may occur when older model outlets are used. More recent outlets are often fitted with a soft-closing mechanism. Alternatively, a shock arrestor can be fitted. Keeping the jolting to a minimum also helps avoid unnecessary wear and tear affecting the DHW system.

12.3 Connection to heat pump

The heat pump can be connected on the sides, back, underneath or on top. At least Ø22 mm copper pipe must be used when connecting the CTC EcoZenith i250 to the CTC EcoAir 406-410 and CTC EcoPart 406-410 heat pumps. CTC EcoPart 412 can also be connected to EcoZenith i250 providing that the function exact primary flow is activated. The charge pump for the heat pumps is factory-installed in the CTC EcoZenith i250L.

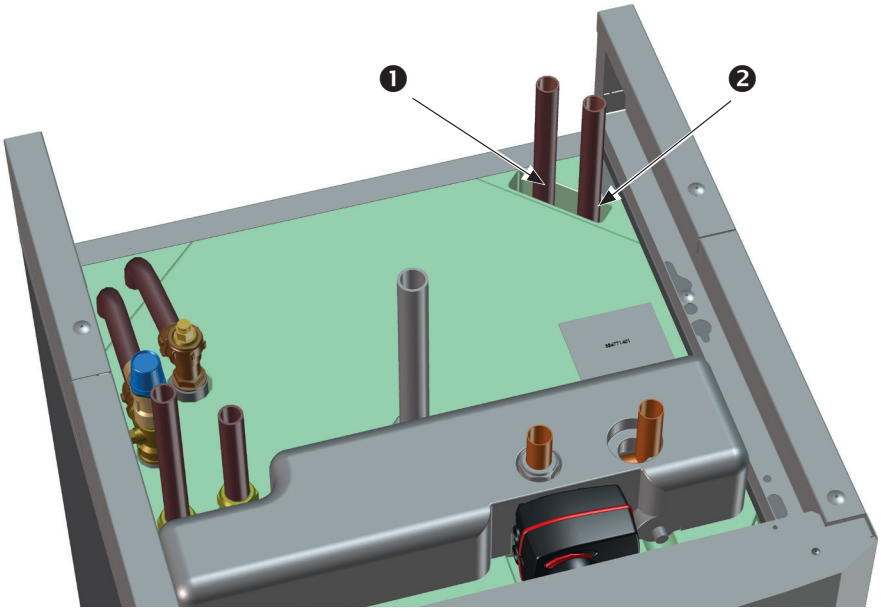
The CTC EcoZenith i250 L has pipes at the rear right edge for connection of the heat pump.

CTC EcoAir's lower connection (5) is connected to the right connection (2) when viewed from the front, so that water is pumped out to the heat pump. CTC EcoAir's upper connection (4) is thus connected to the left connection (1).

The CTC EcoZenith i250 H heat pump is connected directly to the provided charge pump located under the tank. The heat pump's lower connection (5) must be connected to the charge pump (3) so that water is pumped out to the heat pump. The heat pump's upper connection is connected to the right diverting valve (viewed from the front).

Draining: A drain valve must be fitted to the EcoZenith's left connection (where the charge pump is mounted). It functions as drainage for both the boiler and the radiator system.

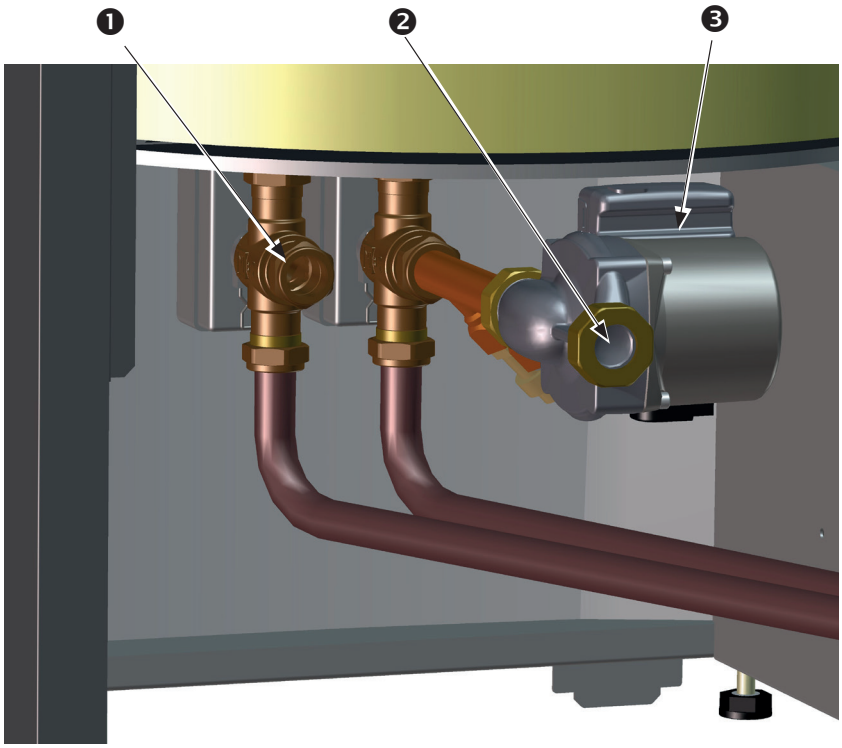
Pipe connection for CTC EcoZenith i250 L



1. Incoming (heated water) from heat pump
2. Outgoing (cold water) to heat pump

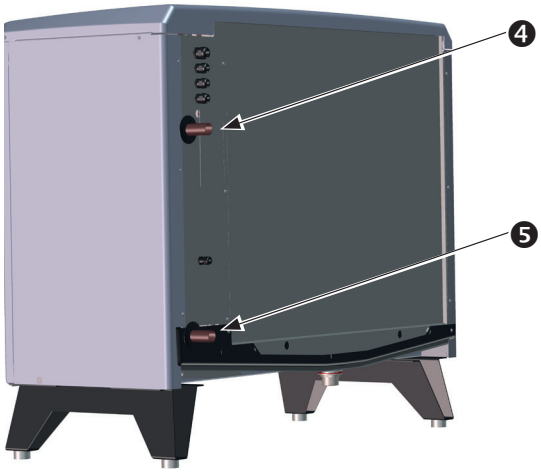
Pipe connection for CTC EcoZenith i250 H

(The picture shows the back of the product)

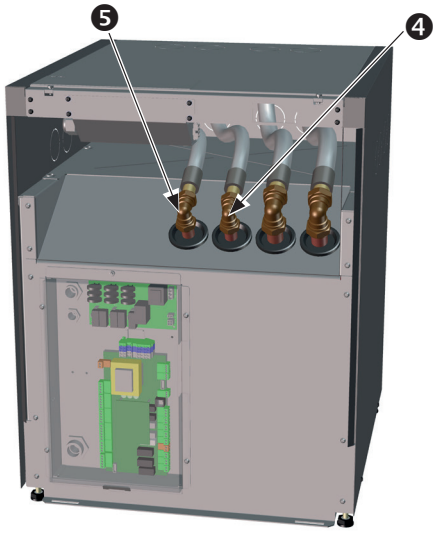


1. Incoming (heated water) from heat pump Ø22mm
2. Outgoing (cold water) to heat pump, union 3/4"
3. Preassembled charge pump on CTC EcoZenith i250L installed on 250 H (behind the diverting valves). The pump pumps water to the connected heat pump.

Pipe connection for CTC EcoAir 400



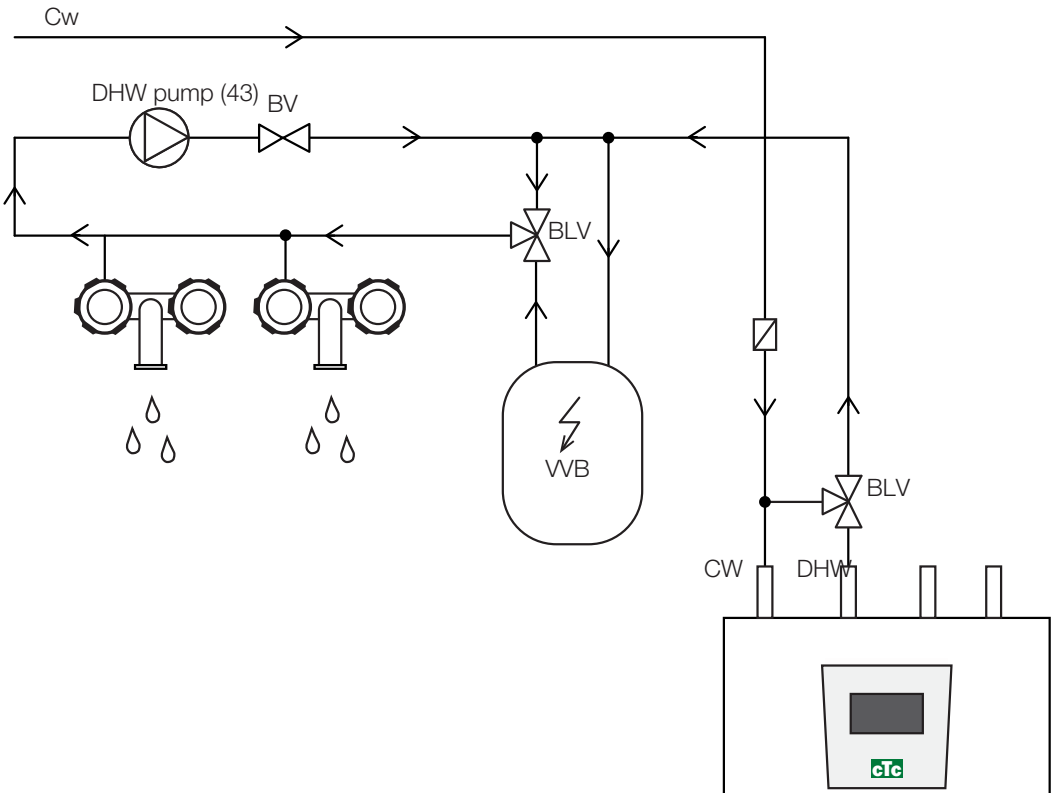
Pipe connection for CTC EcoPart 400



4. Outgoing (heated) water to boiler.
5. Incoming (cold) water from boiler.

12.4 DHW system

You can connect a DHW circulation system. You can see this kind of connection in the figure below.



12.5 External systems (solar heating, pool heating)

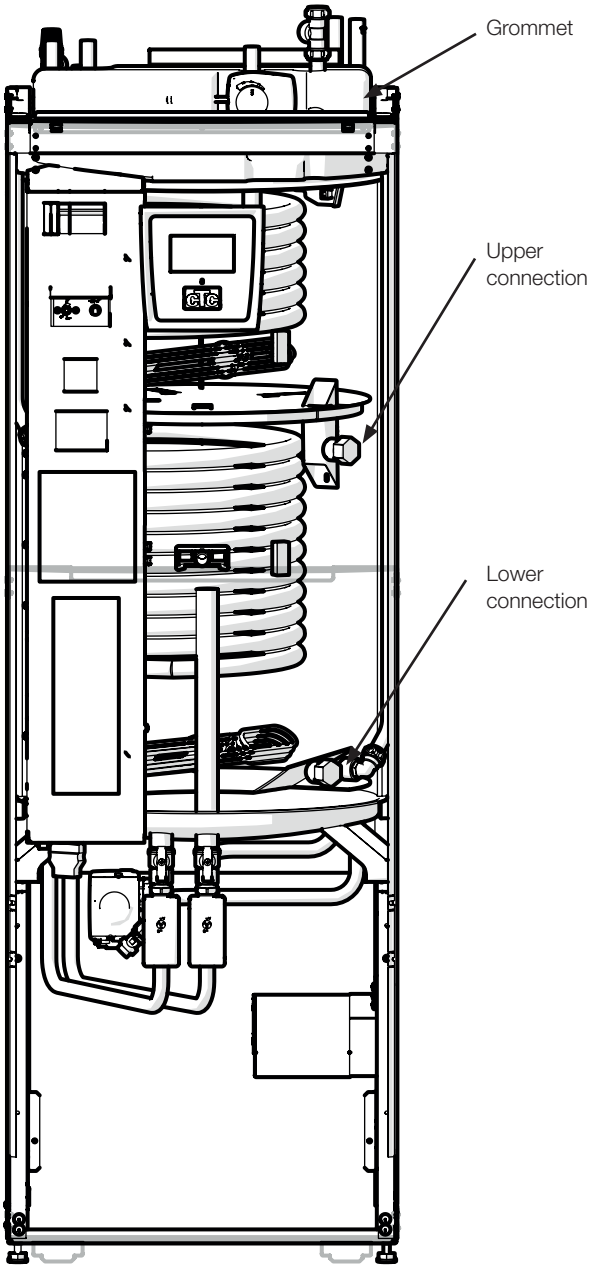
The product is adapted for the connection of external systems for energy supply or heat extraction. In order to avoid damage to the product, it is important that any external system is hydraulically separated through a plate heat exchanger. The connection is made to the front of the unit behind the front panel. Two capped water connections each with 3/4" internal threads suitable for right-angle connectors (3/4" – 22 mm) are situated to the right. Insulated 22 mm copper piping is used to form an outlet through suitably made openings in the top cover.

When an energy supply system (e.g. solar heating) is connected, the water for the solar heating system must be drawn from the lower connection and returned via the upper connection.

NOTE: Solar panels are connected with an intermediate heat exchanger; a solar coil is not built into the CTC EcoZenith i250.

When a heat extraction system is used (e.g. pool heating), the water must be drawn from the upper connection and returned via the lower connection.

Diff thermostat function.
The automation of charging from the external heat source.This will start the pump G46 (230V 1N~, 10A) when the sensor B46 (NTC 22k) has a higher temperature than the temperature in CTC EcoHeat / EcoZenith i250's lower partl



! Connecting external systems can seriously affect the EcoZenith's operation and performance and can therefore produce undesirable effects if the system is not installed correctly.
If you are unsure how to make the connection, contact CTC for suggestions on how to install the system.

13. Electrical installation

Installation and connection in the CTC EcoZenith i250 must be undertaken by an authorised electrician. All wiring must be installed according to applicable regulations. The boiler is internally connected by the factory and set for a 5.5 + 6.0 kW power output. Depending on the country in which CTC EcoZenith i250 is to be installed, it is available with a 400 V or 230 V electrical connection.
Electrical connections are made behind the product's front panel. Undo the screws on the top (2 screws), bend out and put the front to one side (disconnect any network cables on the front printed circuit card for easier access). **The terminal blocks are located behind the electrical connection box cover**. Connection cables are inserted in the cable ducts on the unit's top cover, which exit at the same height as the bottom of the electrical connections box. Sensor cables are inserted separately as far as possible through the cable ducts to the right of the product's top cover.

Safety switch

The installation should be preceded by a dual pole isolating safety switch which ensures disconnection from all electric power sources.

Circulation pump connection for radiator system

The radiator pump is connected electrically to the terminal board. Electrical data: 230V 1N~. Internal fuse 10 A.

Symbol for max. thermostat:

Max. thermostat

If the heat pump has been stored in an extremely cold place, the max. thermostat may have been triggered. You reset it by pressing in the button on the electrical switchboard behind the front panel.
Always check on installation that the max. thermostat has not tripped.

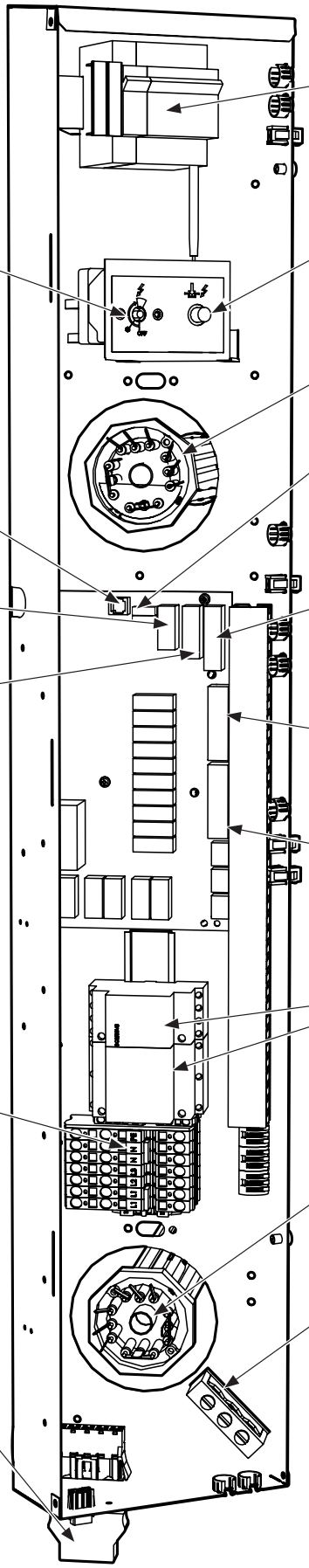
13.1 Electrical installation 400 V 3N~

The CTC EcoZenith i250 must be connected to 400 V 3N~ 50 Hz and protective earth.
Terminal block no.: L1, L2, L3, N, PE.
The minimum group fuse size is specified in “Technical data”.

13.2 Electrical installation 230V 1N~

The CTC EcoZenith i250 must be connected to 230V 1N~ 50 Hz and protective earth. Terminal block no.: L1, N, PE
The minimum group fuse size is specified in “Technical data”.

13.3 Positioning of electrical components



Fast-blow fuses.

Max. thermostat.

Backup heating thermostat.

Upper immersion heater.

Communication HP.
Terminal block: G51-G53
Brown cable: G51
White cable: G52
Green cable: G53

Connection to display.

Terminal block: G11-G22.
Outdoor sensor: G11-G12
Primary flow sensor 1: G13-G14
Primary flow sensor 2: G15-G16
Room sensor 1: G17-G19
Room sensor 2: G20-G22

Terminal block: G41-G48.
Charge pump PWM:
G45-G46

Terminal block: G31-G40.
Return sensor: G31-G32
Extra VV/Night reduction: G33-G34
Current sensor: G37-G40

Terminal block: A11-A20.
Charge pump 1: A12
Mixing valve 2: A15-A17
Diverting valves VV:
A18-A20

Terminal block: A21-A30.
Mixing valve 1: A27-A29

Contactors.

Electrical installation CTC EcoZenith i250
L1 - 3x400 V/(1x230 V)
L2 - 3x400 V
L3 - 3x400 V
N
PE

Lower immersion heater.

Strain reliever.

Heat pump power supply.
The black connector that only supplies any **connected heat pumps** with power is connected here.

13.4 Electrical connection to heat pump

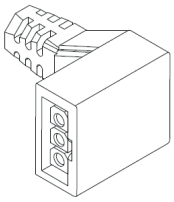
General

The CTC EcoAir 406-410 or CTC EcoPart 406-410 heat pumps receive their power supply from the EcoZenith i250 via a separate connector.

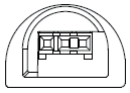
Charge pump

The factory-installed charge pump for heat pumps is connected internally in the CTC EcoZenith i250 L.

The charge pump is connected to CTC EcoZenith i250 H in the pre-assembled connector (Molex and PWM) located under the electrical cabinet.



Charge pump Molex switch



Charge pump PWM switch

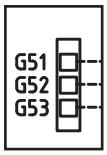
When working on the heat pump

Before starting any work on the heat pump the safety switch installed in front of the CTC EcoZenith i250 should be activated.

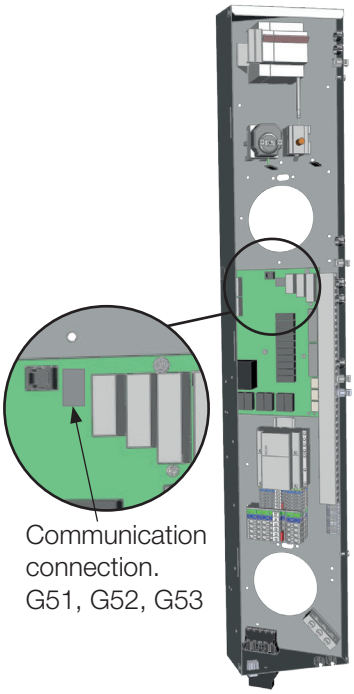
13.4.1 Communication

The CTC EcoAir 406-410 or CTC EcoPart 406-410 heat pumps are controlled from the EcoZenith i250. Other makes of heat pump cannot be controlled from the EcoZenith. Communication between the products takes place via an LiYCY (TP) communication cable, which is a 4-conductor shielded cable, where the communication-bearing conductors are of twisted pair type. The connection is made in the communication port on the PCB and in the heat pump in accordance with its instruction manual.

G51 = Brown cable, G52 = white cable, G53 = green cable.



The detailed illustration from the wiring diagram shows the communication connection.

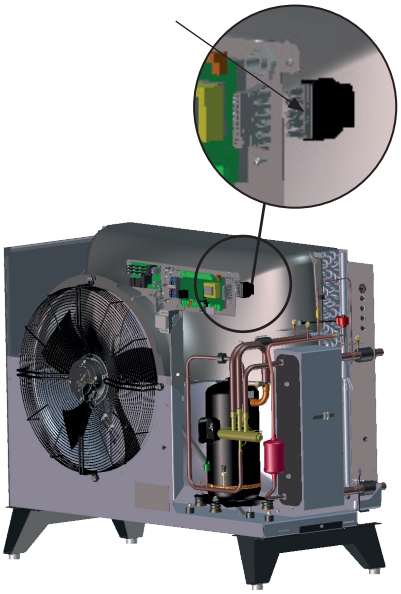


Communication connection. G51, G52, G53

EcoZenith connection box

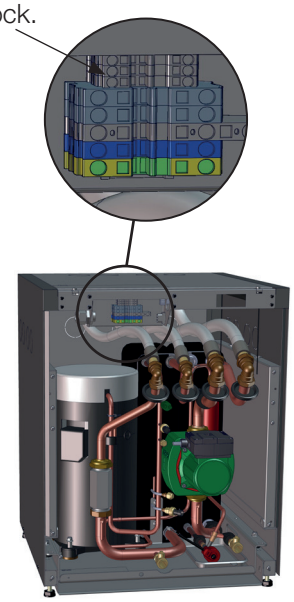
CTC EcoAir 400

Grey communication connector.



CTC EcoPart 400

Communication terminal block.

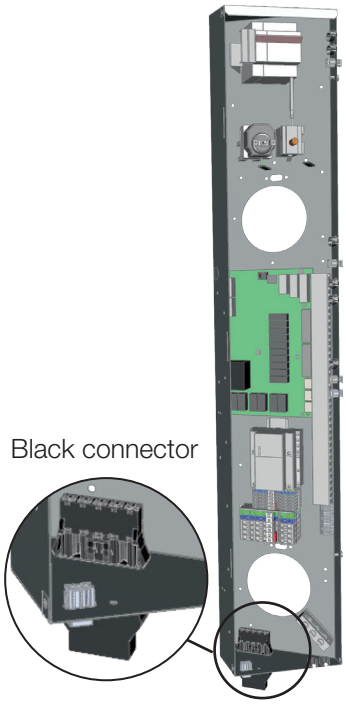


13.4.2 Heat pump power supply 400 V 3N~

The heat pump must be supplied with power from CTC EcoZenith i250 using the provided black connector located in the bottom of the electrical cabinet.
(NB: no supply to CTC EcoZenith i250)
The minimum group fuse size is specified in “Technical data”.
Recommended cable 400 V 3N~ Ölflex 110 5G 2.5 black.
The cable is connected between the products in accordance with the heat pump’s instruction manual.

13.4.3 Heat pump power supply 230 V 1N~

The heat pump must be supplied with power from CTC EcoZenith i250 using the provided black connector located in the bottom of the electrical cabinet.
(NB: no supply to CTC EcoZenith i250)
The minimum group fuse size is specified in “Technical data”.
Recommended cable 230 V 1N~ Ölflex 110 3G 4 black.
The cable is connected between the products in accordance with the heat pump’s instruction manual.



EcoZenith connection box

13.4.4 Connectors provided for heat pump

- We recommend pulling the cable through the cable clip before you connect the wires. The cable clip can also be fitted afterwards. (See figure 1)
  a. Outer sleeve scaled to 55 mm
  b. Wires scaled to 9 mm
  c. Advanced protective earth wires scaled to 7 mm
- Open the terminal block by pushing a screwdriver (blade width 2.5 mm) into the block. Connect the stripped wires in the specified positions. Check that only the stripped parts are clamped to the terminals, NO INSULATION! (see figures 2 and 3)
- Fix the cable clip to the connector. The word TOP should be visible on the terminal and the cable clip (see figure 4)

Push the cable clip onto the connector. Then tighten the screw to obtain the desired tension. (see figure 5)

Connector for supplying power to heat pumps!

1. 2. 3. 4. 5.

13.5 Extra low voltage protection

The following outputs and inputs have extra low voltage protection: current transformer, outdoor sensor, room sensor, primary flow sensor, return sensor, NR/SO, temperature sensor, level switch and PWM signals.

Connection of outdoor sensor (B15)

The sensor should be set up on the house's northwest or north side, so that it is not exposed to morning and evening sun. If there is a risk of the sensor being affected by the sun's rays, it must be protected by a screen.

Place the sensor at around 2/3 of the height of the facade near a corner, but not under a roof projection or other form of wind protection. Do not place it either above ventilation ducts, doors or windows where the sensor may be affected by factors other than the actual outdoor temperature.

> ! Do not attach the sensor cable permanently until you have tested where the best location is.

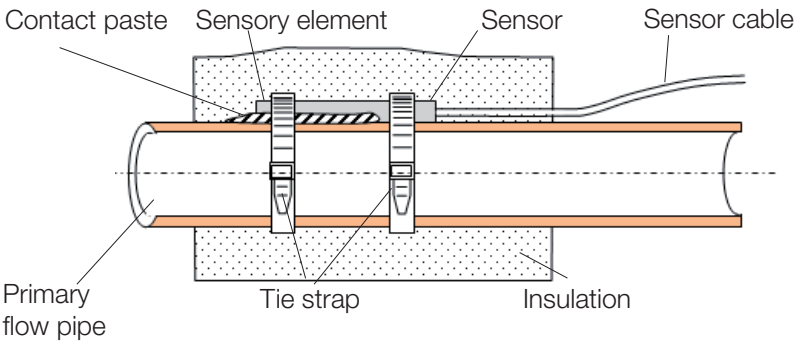
Connection of room sensor (B11) (B12)

The room sensor is fitted at a central point in the house, in the most open position possible, ideally in a hall between several rooms. This is the best position for the sensor to record an average temperature for the house.

Feed a three-conductor cable (minimum 0.5 mm^2) between the heat pump and room sensor. Then attach the room sensor securely in a position at roughly two thirds of the way up the wall. Connect the cable to the room sensor and EcoZenith.

Connection of primary flow sensor (B1, B2) /return sensor (B7)

Fit the primary flow sensor to the primary flow pipe, ideally after the circulation pump. Fit the return sensor to the return pipe.
The sensing part is towards the end of the sensor (see sketch).



- Attach the sensor using the tie strap provided.
- Ensure that the sensor makes good contact with the pipe.
  Apply contact paste to the end part of the sensor between the sensor and the pipe if good contact is otherwise difficult to obtain.
- **Important!** Insulate the sensor using pipe insulation.
- Connect the cables to the EcoZenith's terminal board.

13.5.1 Remote-controlled temperature reduction

The night temperature reduction function can be activated via a closed function on the electricity remote control input, pins G33 and G34 on the terminal board. The function can be controlled remotely using “Minicall”, for instance.
While the input is short circuited, the temperature reduction is activated, regardless of other settings. When the short circuit ceases, the product returns to ordinary settings.
The size of the reduction is set in the menu: Installer/Settings/Radiator system/Prim reduced.

NOTE: the input function can be selected according to the following:

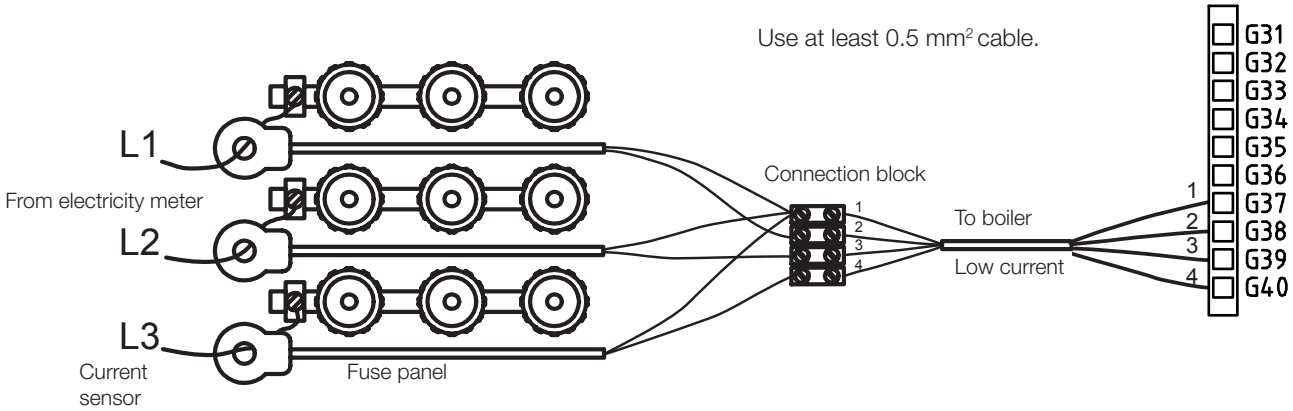
- NR = Night reduction of temperature (time-controlled lowering of temperature)
- SO = Shut off (compressor and power output blocked by the electricity supplier)
- DHW = Extra hot water button (accessory)

13.5.2 Current sensor connection

The three current sensors (designated current transformer on the connection block), one for each phase, are fitted on the fuse panel in the following manner.

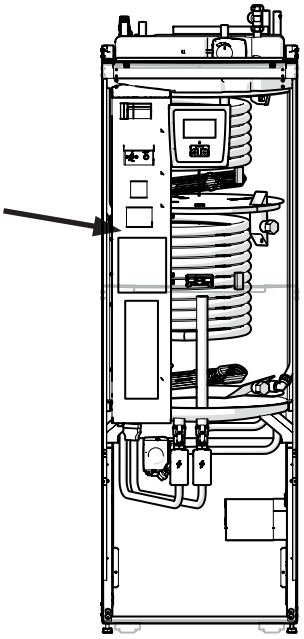
Each phase from the electricity distribution board supplying the EcoHeat is channelled through a current sensor before termination at the relevant terminal. Then connect to the boiler based on the terminal board diagram. This allows the phase current to be sensed all the time and compared with the value set for the EcoZenith’s current monitor. If the current is higher, the control unit drops to a lower heat output. If it is still too high, further reduction in output takes place.

When the current has dropped below the set value again, the output will increase.
This means that the current sensors, along with the electronics, prevent more power being supplied than the main fuses can tolerate.

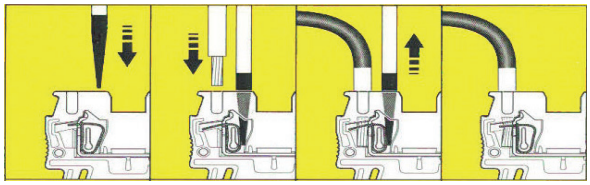


13.5.3 Terminal boards

There are terminal boards for sensors, radiator pumps, etc. behind the panel.



> **!** Open the spring block first using a screwdriver before the cable is inserted. Otherwise, there is a risk of poor contact. Also make sure that the conductor is sufficiently stripped.



G 11 G 12		Utegivare / Outdoor sensor	Klenspänning / Low voltage
G 13 G 14		Framledningsgivare 1 / Primary flow sensor 1	
G 15 G 16		Framledningsgivare 2 / Primary flow sensor 2	
G 17 G 18 G 19	RG-1 RG-2 RG-4	Rumsgivare 1 / Indoor sensor 1	
G 20 G 21 G 22	RG-1 RG-2 RG-4	Rumsgivare 2 / Indoor sensor 2	
G 31 G 32		Returgivare / Return flow sensor	
G 33 G 34		Fjärr- / Rundstyrning Night temp / Ext control	
G 37 G 38 G 39 G 40	Gemensam/Common L1 L2 L3	Strömkännare / Current sensor	
A 15 A 16 A 17	Svart öppna / Black open Brun stäng / Brown close Blå / Blue	Shunt 2 / Mixing Valve 2	230V 1N~
A 31 A 33 PE	L1 N PE	Radiator pump 1	
A 36 A 34 PE	L1 N PE	Radiator pump 2	
L1 L2 L3 N PE		Matning / Power supply	400V 3N~

13.6 Settings made by the installation electrician.

The following settings shall be made by the installation electrician after installation:

- Select main fuse size
- Select the power limitation for the immersion heater.
- Check room sensor connection
- Check that the sensors connected indicate reasonable values.

Carry out the following checks:

Main fuse and effect limitation settings

See the chapter on First start and where appropriate First start.

Check room sensor connection

- Go to the menu: Installer/Service/Function test/Radiator system.
- Go down and select the option LED room sensor and press OK.
- Select On using the + button and press OK.
  Check that the room sensor LED lights up. If not, check the cables and connection.
- Select Off using the - button and press OK. If the OK LED goes off, the check is complete.
- Return to start menu by pressing the Home button.

Check connected sensors

If any sensor is incorrectly connected, a message will appear on the display, e.g. “Alarm sensor out”. If several sensors are incorrectly connected, the different alarms are displayed on different rows.

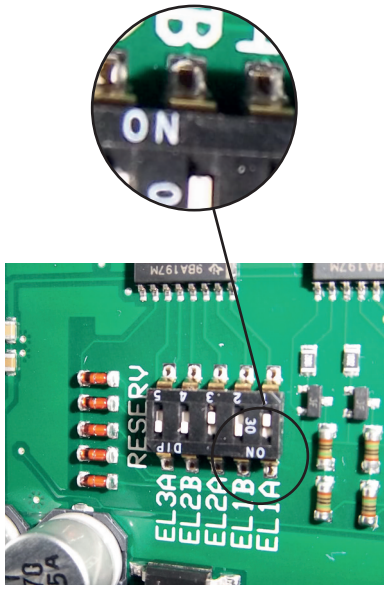
If no alarm is displayed, the sensors are connected correctly.

The current sensor connection has no alarm, but the current value can be read in the Operation data menu. Note that the tolerance/accuracy is very low with small current values.

13.7 Installing a backup power supply

The DIP switch on the PCB is used to set the backup power supply. The DIP switch is marked "RESERV" (BACKUP).

When the switch is set to ON, the step is actively operating in backup heating mode.



3x400 V

Switch	5	4	3	2	1
Phase	L3	L2	L2	L1	L1
Current	10 A	10 A	2.6 A	10 A	1.3 A
Power	1.2 kW	2.3 kW	0.6 kW	2.3 kW	0.3 kW

1x230 V

Switch	-	4	3	2	1
Phase	-	L2	L2	L1	L1
Current	-	8.7 A	8.7 A	8.7 A	13 A
Power	-	2.0 kW	2.0 kW	2.0 kW	3.0 kW

14. Connecting –Increased immersion heater output 15 kW to 18 kW.

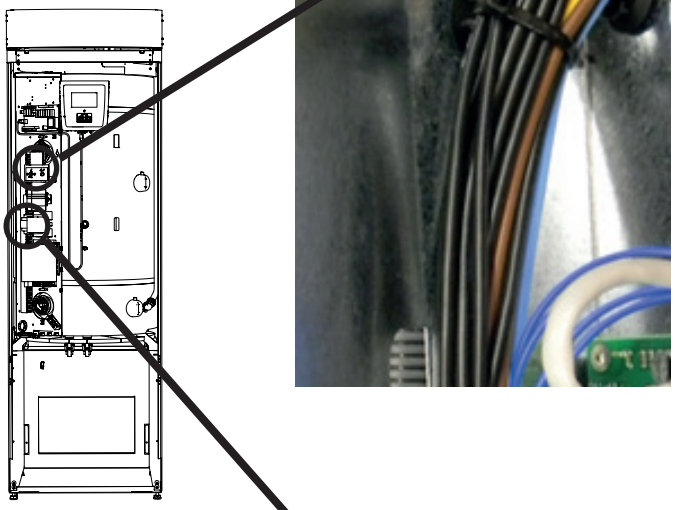
CTC EcoZenith i250 3x400 V can be reconnected to a 18 kW immersion heater.

NB: Installation must be carried out by a qualified electrician.

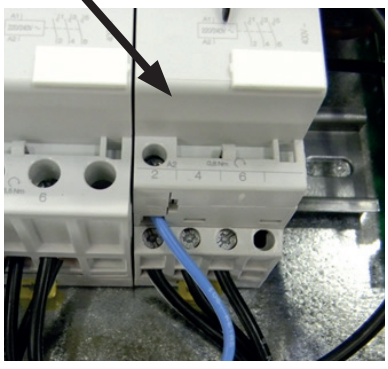
Connecting

1. Begin by disconnecting the power to the product.

2. Free the three black wires with insulation sleeves from the cabling.

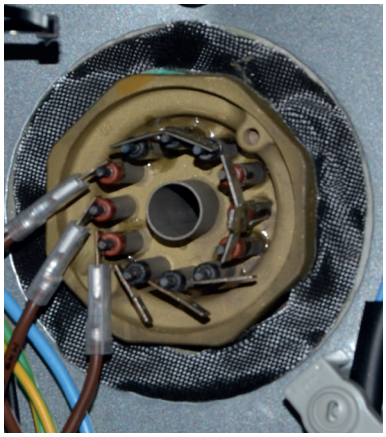


3. Undo the smallest switch (K2 on the electrical diagram) by pulling the yellow fastening backwards.



4. The black wires should have a designation stating the cable number and connection position. For example, 46 K2:1, where the 1 stands for screw joint position 1.
   Begin by loosening the screw joint at position 1 and freeing the brown wire. Mount the brown and respective black wires in the same screw joint.
   Repeat for screw joints on positions 3 and 5.
   Tighten screw joints 1 to 5, inclusive.
   Remount the switch on the DIN rail and lock using the yellow catch.
   Then check that the switch is firmly in position on the DIN rail.

5. Mount the black wires in the free spaces on the electric heater.
   NB: Only for angled flat pins with black end cable sleeves.



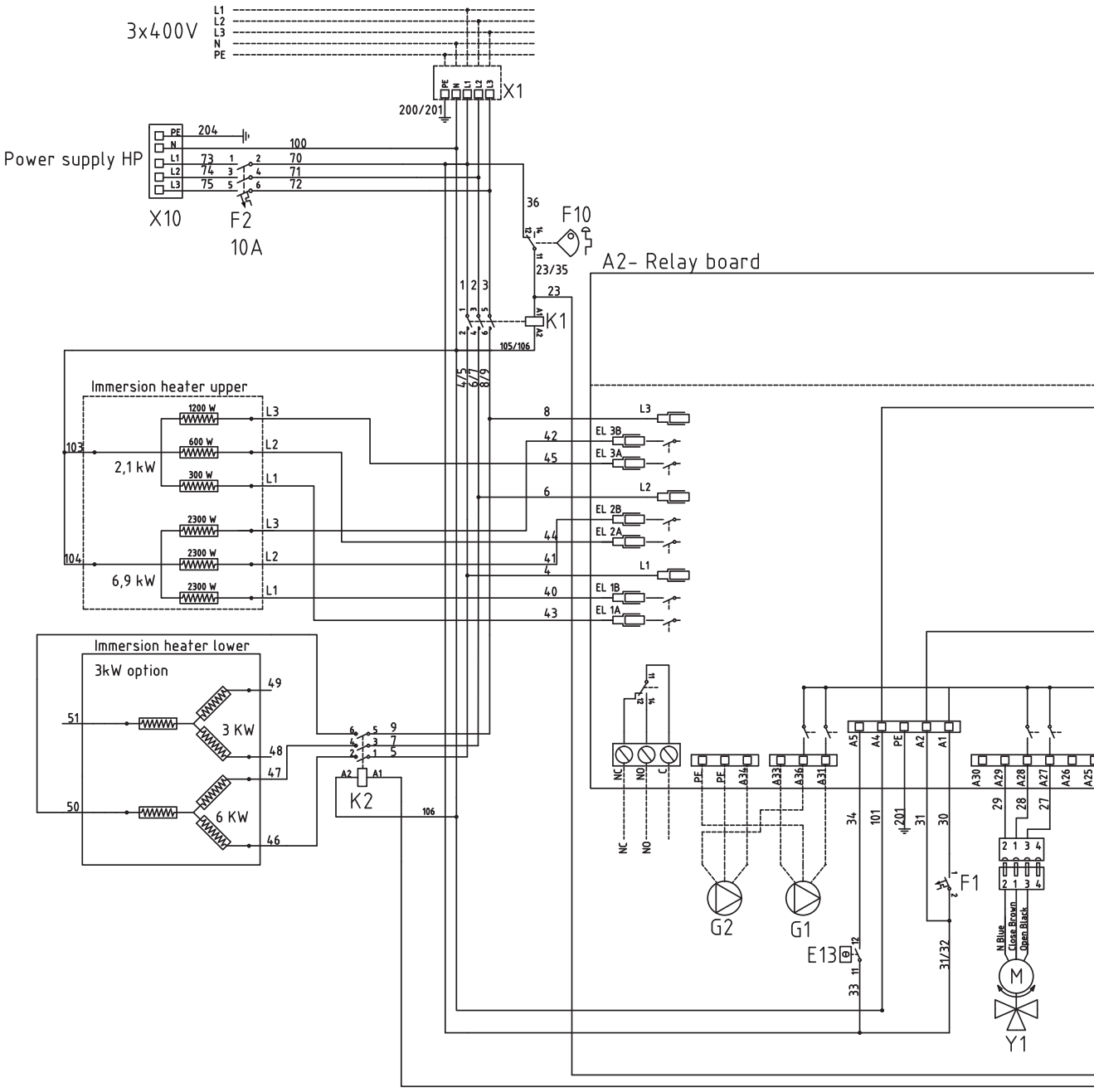
15. Connection – pump to operating thermostat function

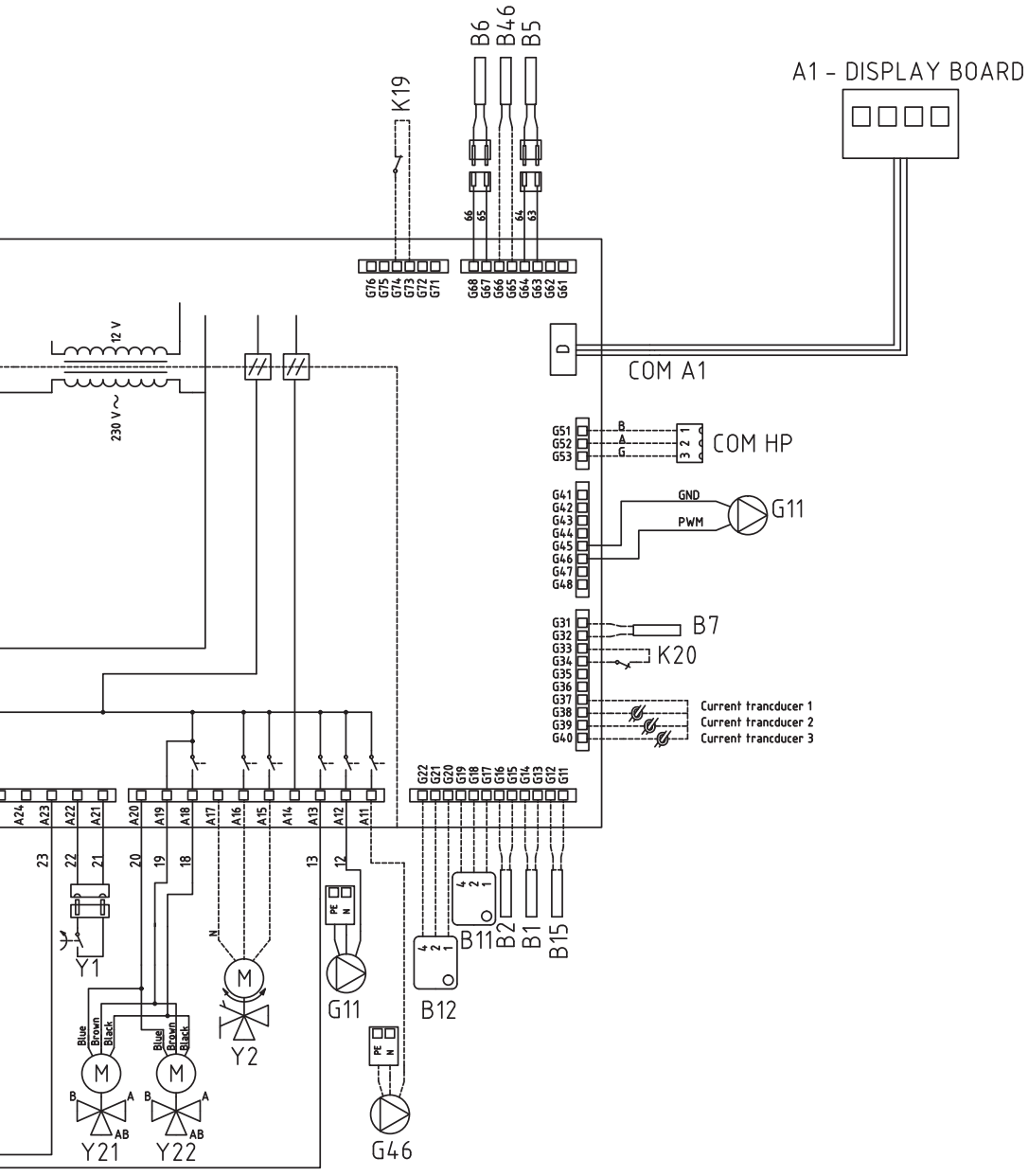
230 V 1N~
The circulation pump is connected at the following terminal blocks:
Relay card in EcoZenith i250 or EcoHeat 400 (see wiring diagram for the relevant product).
Note the cable colours!

Phase:	brown	Terminal block A:11(EcoZenith i250) Terminal block A:12 (EcoHeat 400)
Zero:	blue	
Earth:	yellow/green	

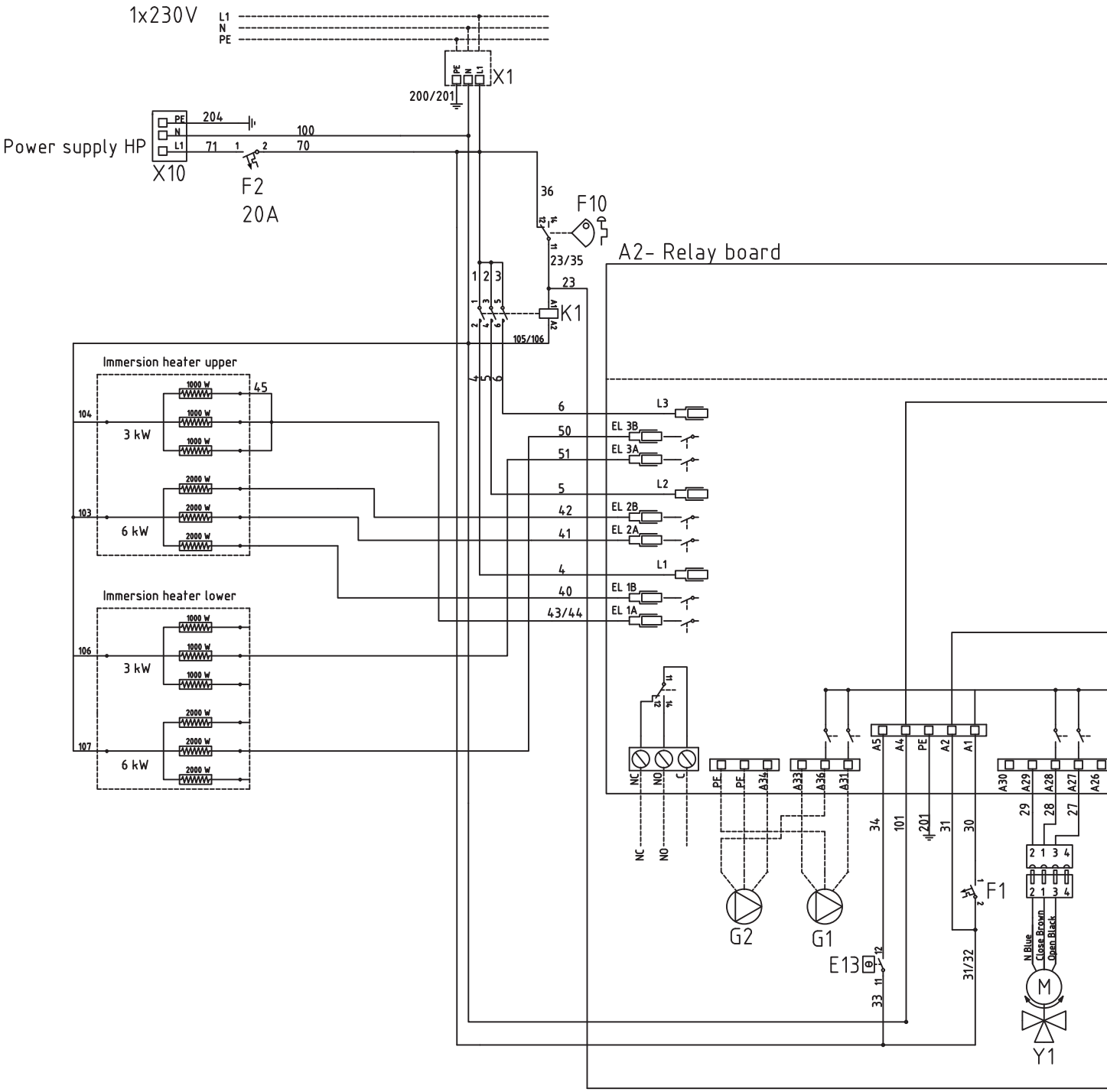
Check the function by test running the pump in menu “Installer/Service/ Function test” in the control system.

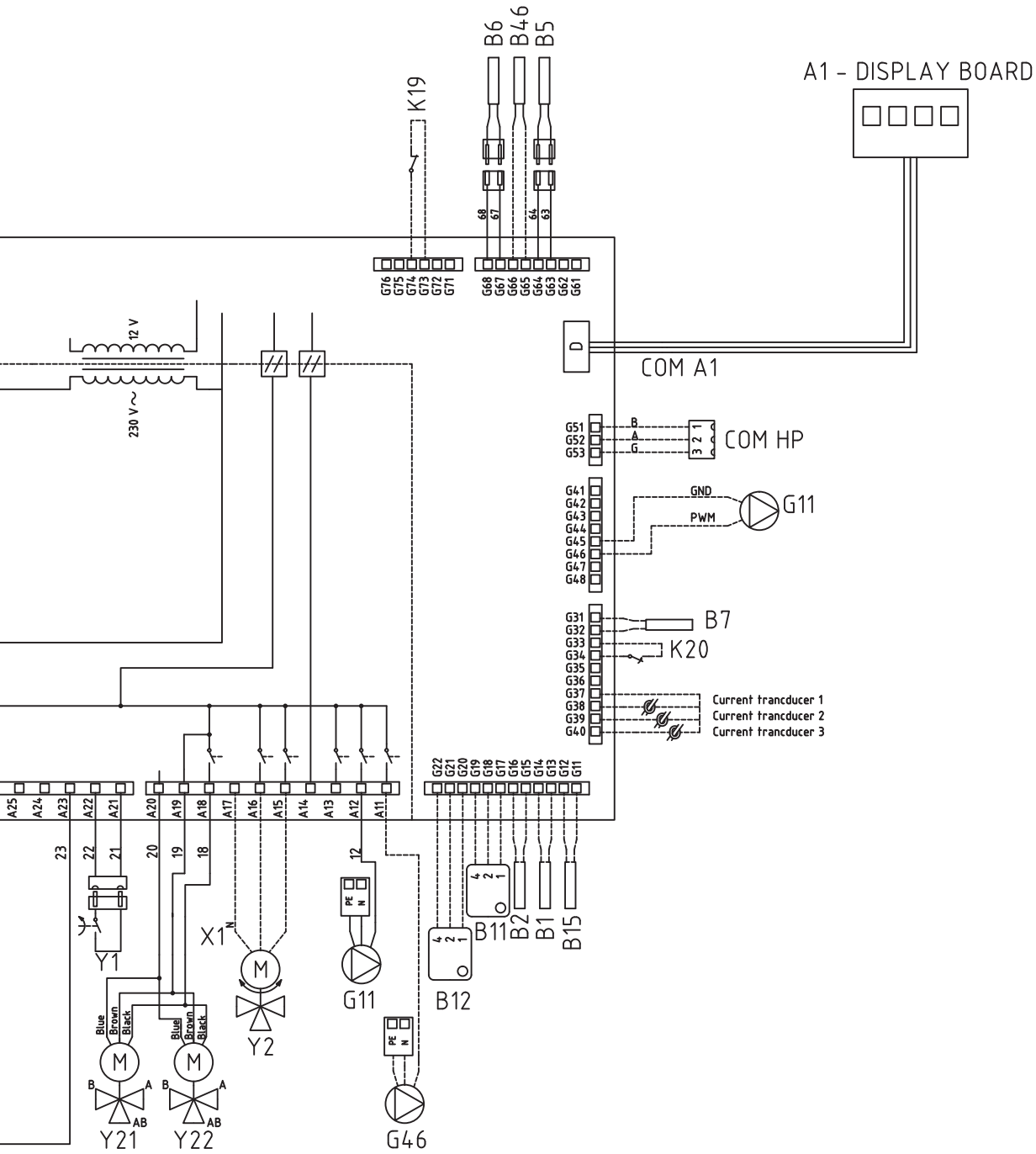
15.1 Wiring diagram 3x400 V




A1 - DISPLAY BOARD
B6
B46
B5
K19
COM A1
COM HP
GND
PWM
G11
B7
K20
Current trancducer 1
Current trancducer 2
Current trancducer 3
12 V
230 V~
Y1
Y2
Y21
Y22
G11
G46
B12
B11
B2
B1
B15
Blue
Brown
Black

15.2 Wiring diagram 1x230 V




A1 - DISPLAY BOARD
B6
B46
B5
K19
COM A1
COM HP
G11
GND
PWM
B7
K20
Current trancducer 1
Current trancducer 2
Current trancducer 3
12 V
230 V ~
X1
Y1
Y2
Y21
Y22
G46
B12
B11
B2
B1
B15
Blue
Brown
Black

15.3 Component list, wiring diagram

No.	Component.	Terminal block no.
A1	Display	
A2	Relay/main card	
B1	Primary flow sensor 1	G13, G14
B2	Primary flow sensor 2	G15, G16
B5	Upper tank sensor	G63, G64
B6	Lower tank sensor	G67, G68
B7	Return sensor	G31, G31
B11	Indoor sensor 1	G17, G18, G19
B12	Indoor sensor 2	G20, G21, G22
B15	Outdoor sensor	G11, G12
B46	Sensor Ext tank - Diff thermostat function	
COM HP	Communication heat pump	G51 = Brown cable, G52 = white cable, G53 = green cable.
E13	Backup heating thermostat E13	
F1	Automatic circuit breaker 10 A	
F2	Automatic circuit breaker HP 10 A	
F10	Max. thermostat	
G1	Radiator pump 1	A31, A33, PE
G2	Radiator pump 2	A34, A36, PE
G11	Charge pump 1	
G46	Charge pump Ext tank - Diff thermostat function	
K1	Contactor 1	
K2	Contactor 2	
K19	Pressure/level switch	G73, G74
K20	Night red/circulation/extra DHW	G33, G34
X1	Terminal block, incoming supply	L1, L2, L3, N, PE
X10	Terminal block, HP supply	Black connector
Y1	Mixing valve 1	A27, A28, A29
Y2	Mixing valve 2	A15, A16, A17
Y21	Diverting valve DHW	A18, A19, A20
Y22	Diverting valve DHW	A18, A19, A20

15.4 Resistances for sensors

NTC 22K

Temperature °C	Brine, HP, El. boiler, Primary flow, Room sensor Resistance Ohm
130	800
125	906
120	1027
115	1167
110	1330
105	1522
100	1746
95	2010
90	2320
85	2690
80	3130
75	3650
70	4280
65	5045
60	5960
55	7080
50	8450
45	10130
40	12200
35	14770
30	18000
25	22000
20	27100
15	33540
10	41800
5	52400

NTC 150

Temperature °C	Outdoor sensor Resistance Ohm
70	32
65	37
60	43
55	51
50	60
45	72
40	85
35	102
30	123
25	150
20	182
15	224
10	276
5	342
0	428
-5	538
-10	681
-15	868
-20	1115
-25	1443
-30	1883
-35	2478
-40	3289

16. First start

When the CTC EcoZenith i250 is delivered, the heat pump is blocked to avoid it being started unintentionally. EcoZenith I250 can be installed and started before the bedrock/ground source or air/water heat pump is put into operation.

The EcoZenith i250 can also be started without a room sensor being fitted as the curve which has been set then regulates the heating. Deselect the room sensor in the Settings menu. The sensor can however always be fitted for the alarm LED function.

Before first start

1. Check that the EcoZenith I250 and system are full of water and have been bled.
   (The EcoZenith i250 is bled through the safety valve on the top cover of the product.)
2. Ensure that the brine system is filled with water and antifreeze and that it is bled, or ensure that the compressor is blocked.
3. Check that all connections are tight.
4. Check that sensors and the radiator pump are connected to the power source.
5. The backup heating thermostat has OFF as its factory setting. The recommended position is ❄ = Antifreeze setting, around +7°C. The backup heating thermostat is reset on the electrical switchboard behind the front panel. It is in the OFF position when it is turned anticlockwise as far as it will go (the screwdriver slot should be vertical).

Symbol for backup heating thermostat:

NB: On installation in a newly built dwelling, the regulations of the Swedish National Board of Housing, Building and Planning (Boverket) must be adhered to when setting maximum power output. The installer must key in the four figure code 8818 under the menu: Service/Factory settings coded, within one week – this locks maximum power. The maximum power output must also be written on the rating plate with a marker.

NB: At the end of the installation, check the current transformers' connection. In this situation it is important that you have switched off any major consumers of electricity in the house. Also make sure that the backup thermostat is turned off.

First start

Switch on the power using the safety switch. The display comes on.
CTC EcoZenith i250 now asks the following:

1. Select the language and press next.
2. Confirm that the system is filled with water and press OK. Press next.
3. Size of main fuse Choose between 10 and 35 A.
4. Specify the maximum electric heater power. Choose between 0.0 and 9.0 kW in different steps.
   (This value does not lock the supply, but the value can be changed in the settings menu.)
5. Select the option permitting the compressor (if the collector system is ready or the air/water pump is already installed). When the compressor is started for the first time, it is automatically checked that it is running in the correct direction. An error message is displayed in the panel display if it is rotating in the wrong direction. Switch any two phases to change the direction of rotation. Use your hand to feel that the hot gas pipe immediately becomes warm when the compressor starts, but bear in mind that the pipe may be hot!
6. Specify the max. primary flow °C for radiator system 1.
7. Specify the inclination for radiator system 1.
8. Specify the adjustment for radiator system 2. If the primary flow sensor for radiator system 2 is installed, repeat steps 7 to 9 for radiator system 2.
9. Current sensors identified. The CTC EcoZenith i250 then starts and the start menu appears.

! The maximum power output must be written on the rating plate with a marker.

! Save these settings under: Installer/ Settings/Save settings

Enertech Group

Försäkran om överensstämmelse
Déclaration de conformité
Declaration of conformity
Konformitätserklärung

Enertech AB

Box 313

S-341 26 LJUNGBY

försäkrar under eget ansvar att produkten

confirme sous sa responsabilité exclusive que le produit,

declare under our sole responsibility that the product,

erklären in alleiniger Verantwortung, dass das Produkt,

EZ250 C1 3x400V E18/
EZ250 C1 1x230V E12/ EZ250 C1 3x230V E14

som omfattas av denna försäkran är i överensstämmelse med följande direktiv,

auquel cette déclaration se rapporte est en conformité avec les exigences des normes suivantes,

to which this declaration relates is in conformity with requirements of the following directive,

auf das sich diese Erklärung bezieht, konform ist mit den Anforderungen der Richtlinie,

EC directive on:

Pressure Equipment Directive 97/23/EC, § 3.3

(AFS 1999:4, § 8)

Electromagnetic Compatibility (EMC) EN 2004/108/EC

Low Voltage Directive (LVD) EN 2006/95/EC

Överensstämmelsen är kontrollerad i enlighet med följande EN-standarder,

La conformité a été contrôlée conformément aux normes EN,

The conformity was checked in accordance with the following EN-standards,

Die Konformität wurde überprüft nach den EN-normen,

EN 55014-1 /-2

EN 61 000-3-2/3-3/4-2,-3,-4,-5,-6,-11

EN 60335-1, 2-21

EN 62233

Ljungby 2013-06-26

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